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**AD-A227 301**

**Installation Restoration Program  
Phase II — Confirmation/Quantification  
Stage 1**

**Dover Air Force Base  
Dover, Delaware 19901**

*Science Applications International Corporation  
8400 Westpark Drive, McLean, VA 22102*

June 1986

**Final Report 9/84 to 6/86  
Volume 2 — Appendices**

HQ AFESC/TIC (FL 7050)  
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United States Air Force  
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Brooks Air Force Base, TX 78235-5501

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APPENDIX A: Glossary



## GLOSSARY

AFB: Air Force Base.

AFESC: Air Force Engineering and Services Center.

Ag: Silver.

Air Surging: A procedure for developing wells whereby compressed air is pumped down a well and allowed to bubble up through the water column in the well.

ALS: Above land surface.

Annular Space: The space between a borehole and the outside of a well screen or casing.

Aquifer: A geologic formation, group of formations, or part of a formation that is capable of yielding water to a well or spring.

As: Arsenic.

Auger: A screwlike boring tool resembling a carpenter's auger bit but much larger, usually motor-driven, designed for use in clay, soil, and other relatively unconsolidated near-surface materials.

Bailer Wash: A sample of distilled water poured through the bailer that is analyzed to evaluate decontamination procedures.

Blow Count: The total of the number of strikes with a freefalling weight needed to drive a sampler a given distance into the ground.

BLS: Below land surface.

Braided Channel: Channel created by a stream flowing in several dividing and reuniting channels, creating a netlike pattern.

BW: Bailer wash.

Cd: Cadmium.

Channel: An abandoned or buried water course represented by deposits of sand or gravel.

Clay: Fine-grained aggregate consisting wholly or dominantly of microscopic and submicroscopic mineral particles.

CN: Cyanide.

Coalesce: The union of individual streams into a single stream or braided stream.

Coastal Plains: Physiographic province of the Eastern United States characterized by a gently seaward sloping surface formed over exposed, unconsolidated, stratified marine fluvial sediments. Typical coastal plain features include low hills and ridges, organic deposits, flood-plains, and high water tables.

Cone of Depression: The depression, roughly conical in shape, produced in a water table or potentiometric surface, by pumping or artesian flow.

Confining bed, layer, or unit: Body of impermeable or distinctly less permeable material stratigraphically adjacent to one or more aquifers.

Cr: Chromium.

Cross-section: Geologic diagram or actual field exposure showing the geologic formations and structures transected by a given plane.

Cu: Copper.

CWA-WQC: Clean Water Act Quality Criteria for Human Health.

DAFB: Dover Air Force Base.

Differential Subsidence: The relative change in how materials subside over time which results in uneven surfaces developing.

Diffusion: The spreading out of molecules, atoms, or ions into a porous medium in a direction tending to equalize concentrations in all parts of the system.

Dip: Angle at which a stratum or any planar feature is inclined from the horizontal.

Discharge: As it pertains to groundwater; the flow of groundwater directly from the zone of saturation onto land or into a surface water body.

DNREC: Delaware Department of Natural Resources and Environmental Control.

DOD: Department of Defense.

Downgradient: In the direction of decreasing hydraulic static head; the direction in which groundwater flows.

Drawdown: A lowering of the water table or potentiometric surface caused by pumping of groundwater from wells.

EDM: Electronic distance meter.

Effective Porosity: The amount of interconnected pore space through which fluids can pass.

EPA: The U.S. Environmental Protection Agency.

EPA Method 601: GC test method for the determination of 29 purgeable halocarbons.

EPA Method 602: GC test method for determination of 7 purgeable aromatics.

EPA Method 624: GC/MS test method for the determination of volatile organic compounds amenable to the purge and trap method.

EPA Method 624 (modified): The same as the standard 624 test but with an extra purge and trap to detect hydrocarbons in fuels lighter than kerosene.

EPA Method 625 (extractables): GC/MS test method for the determination of organic compounds that are solvent extractable. Extractable fractions include base/neutral and acid extractables.

EPA Method 625 (Pesticides and PCB's): Same as for 625 (extractable) test but for pesticide and PCB extractables.

Facies: A stratigraphic body as distinguished from other bodies of different appearance or composition.

Fb: Field blank.

Fe: Iron.

FIT: Field investigation team.

Field Blank: A sample of distilled water that is analyzed to determine if the distilled water contains contaminants that could be introduced to sampling equipment and ultimately to the samples through decontamination processes.

Field Duplicate: A sample of any media collected at the same time and place as the identified media sample. Duplicate samples are analyzed to indicate the overall precision of sampling and analytical procedures.

Flow Path: The direction or movement of groundwater as governed principally by the hydraulic gradient.

Ft: Feet.

Ft/day: Feet/day.

Glauconitic Sand and Gravel: A mixture of sand, gravel, and glauconite, an iron-potassium silicate mineral which imparts a green color to the mixture.

gpd: Gallons per day.

gpm: Gallons per minute.

Groundwater: Subsurface water in a zone of saturation.

Groundwater Divide: A line on a water table on each side of which the water table slopes downward in a direction away from the line.

Hard Stand: Parking area or ramp adjacent to taxiway where aircraft are parked or stored.

HARM: Hazard Assessment Rating Methodology.

Head Level: The height of a vertical column of water; dependent upon hydrostatic pressure.

Hg: Mercury.

Hydraulic Conductivity: A coefficient of proportionality describing the rate at which water can move through a permeable medium.

Hydraulic Gradient: The change in total head with a change in distance in a given direction. The direction is that which yields a maximum rate of decrease in head.

Hydraulic Rotary: The hydraulically driven drilling method which rotates the drill pipe and bit while circulating fluid under pressure to force cuttings to the surface.

Hydrograph: A graph showing stage (level), flow or velocity of water with respect to time.

IRP: Installation Restoration Program.

IW: Industrial waste water.

JP-4: Jet propulsion fuel No. 4

K: Hydraulic conductivity.

Laboratory Replicate: An aliquot or split of an actual sample. Replicate or split samples are analyzed to document the precision of the analytical method.

Leachate: A solution resulting from the separation or dissolving of soluble or particulate constituents from solid waste or other man-placed medium by percolation of water.

Leaching: The process by which soluble materials in the soil, such as nutrients, pesticide chemicals, or contaminants, are washed into a lower layer of soil or are dissolved and carried away by water.

Lens: Body of rock material bounded by converging surfaces, at least one of which is curved.

MAC: Military Airlift Command.

Marl: Incoherent sands consisting of calcareous clays and particles of calcite or dolomite.

MATS: Military Air Transport Service.

MCL: Safe Drinking Water Act Maximum Contaminant Levels.

MGD: Million gallons per day.

mg/l: Milligrams per liter.

Miocene: The fourth of the five epochs of the Tertiary period. The Miocene occurred between approximately 12 and 26 million years ago.

ml: Milliliters.

Mn: Manganese.

MoGas: Motor gasoline.

Monitoring Well: A well used to measure groundwater levels and to obtain samples.

MSL: Mean Sea Level.

Net Precipitation: The amount of annual precipitation minus annual evaporation.

Ni: Nickel.

NPL: National Priorities List of Hazardous Waste Sites.

O&G: Oil and Grease.

Organic: Being, containing, or relating to carbon compounds, especially in which hydrogen is attached to carbon.

Outcrop: Part of a body of rock that appears bare and exposed at the surface of the ground.

Pb: Lead.

PCB: Polychlorinated Biphenyls; liquids used as a dielectric in electrical equipment.

PCE: Perchloroethylene, tetrachloroethylene, or tetrachloroethene.

PD-680: Cleaning solvent.

Permeability: The capacity of a porous rock, soil, or sediment for transmitting a fluid without damage to the structure of the medium.

pH: Negative logarithm of hydrogen ion concentration.

Pleistocene: First epoch of the Quaternary period, in general including the time and deposits of the last great glacial epoch.

Potentiometric Surface: A surface that represents the level to which water will rise in tightly cased wells. The water table is a particular potentiometric surface for an unconfined aquifer.

POC: Purgeable Organic Carbon.

Poorly Sorted: Having a poor degree of similarity in terms of grain size within a mass of material.

Porosity: Property of a rock containing interstices without regard to size, shape, intercommunication, or arrangement of openings.

ppb: Parts per billion.

ppm: Parts per million.

Priority Pollutant: One of 119 compounds that have been identified as hazardous in waters by EPA.

Priority Pollutant Scan: A series of tests to determine the presence of all priority pollutants.

Priority Pollutant Organics: The organic priority pollutant compounds identifiable by EPA methods 624 and 625.

Purging: Withdrawing a predetermined amount of water from a groundwater monitoring well prior to collecting samples. Purging is performed to ensure representative samples of the groundwater are collected.

Recharge: Processes by which water is absorbed and is added to the zone of saturation, either directly into a formation, or indirectly by way of another formation.

Regressing: The lowering of the sea level or retreating of the shoreline seaward.

SAC: Strategic Air Command.

SAIC: Science Applications International Corporation.

SNARLS: Safe Drinking Water Act Suggested No Adverse Response Limits Health Advisories.

SOW: Statement of Work.

Specific Capacity: An expression of the productivity of a well, obtained by dividing the rate of discharge of water from the well by the drawdown of the water level in the well.

Specific Gravity: The ratio of the mass of a body to the mass of an equal volume of water at 4°C or other specified temperature.

Specific Yield: The ratio of the volume of water a rock or soil will yield by gravity drainage to the volume of the rock or soil.

Split Spoon: A type of soil sampler consisting of a length of hollow tubing split lengthwise and threaded at both ends. A drive head and a coupling hold the two halves together. The sampler is pounded into the soil a set distance. The sample is examined by removing the drive head and coupling and opening the split barrel.

Strike: The direction of a horizontal line in the plane of an inclined stratum, joint, fault, cleavage plane, or other structure; perpendicular to the direction of dip.

Subcrop: Area within which a formation occurs directly beneath an unconformity.

TAC: Tactical Air Command.

TCE: Trichloroethylene or trichloroethene.

TOC: Total Organic Carbon.

TOX: Total Organic Halogens.

Transgressing: The raising of sea level or advancing of the shoreline landward.

Transmissivity: The rate at which water of a prevailing density and viscosity is transmitted through a unit width of an aquifer or confining bed under a unit hydraulic gradient. Transmissivity can be calculated by multiplying the hydraulic conductivity by the aquifer's saturated thickness.

ug/l: Micrograms per liter.

Undulating Surface: Smooth but irregular surface of bedding planes or contacts commonly formed by differential erosion or differential compaction.

Upgradient: In the direction of increasing hydraulic static head; the direction opposite to the prevailing flow of groundwater.

USAF: United States Air Force.

USAFOEHL: United States Air Force Occupational and Environmental Health Laboratory.

USAFOEHL LOC: USAFOEHL Levels of Concern.

USEPA CAG: USEPA Carcinogenic Assessment Group.

USGS: United States Geological Survey.

v: Velocity.

VOA: Volative Organics Analysis.

VOC: Volative Organic Compounds identified by EPA Methods 601 and 602.

Water Table: Upper surface of a zone of saturation except where that surface is formed by an impermeable body.

Well Log: Systematic and sequential record of geologic data obtained from a well.

Well Point: A well that is commonly installed by driving the casing and screen into the ground pneumatically or by the combined action of rotating the casing and screen while injecting water under pressure to flush out cuttings.

WTP: Waste water treatment plant.

Zn: Zinc.



APPENDIX B: Scope of Work

Installation Restoration

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Phase II Field Evaluation

Dover AFB DE

I. Description of Work

The purpose of this task is to determine if environmental contamination has resulted from waste disposal practices, fuel spills and fire training activities at Dover AFB DE; to provide estimates of the magnitude and extent of contamination, should contamination be found; to identify potential environmental consequences of migrating pollutants; to identify any additional investigations and their attendant costs necessary to properly evaluate the magnitude, extent, and direction of movement of discovered contaminants.

Ambient air monitoring of hazardous and/or toxic material for the protection of contractor and Air Force personnel shall be accomplished when necessary, especially during the drilling operation.

The presurvey report (mailed under separate cover) and Phase I IRP report (mailed under separate cover) incorporated background and description of the sites for this task. To accomplish the survey effort, the contractor shall take the following steps:

A. General

1. Determine the aerial extent of each site by reviewing available aerial photos of the base, both historical and the most recent panchromatic and infrared, and by field reconnaissance.

2. Locations where surface water, sediment, and core samples are collected shall be marked with a permanent marker, and the location recorded on a site map.

3. A total of 38 ground-water monitoring wells shall be installed. The exact location of the wells shall be determined in the field.

4. Columbia Aquifer Wells: Wells in the unconfined surficial aquifer shall be drilled using 6-inch hollow-stem augers or by rotary methods. Each ground-water monitoring well shall be constructed of 2-inch I.D. Schedule 40 PVC casing and screen. Ground-water monitoring wells shall be completed to the top of the Kirkwood confining layer, and the entire saturated interval shall be screened. The screened interval in each well shall consist of 0.010 inch slotted PVC screen depending upon the geologic findings during the drilling operation. The annulus of the screened interval shall be gravel packed with #1 grade gravel or equivalent, as determined in the field as suitable for the soil formation. The gravel pack shall extend to 2 feet above the top of the screen. Heavy bentonite mud or pellets shall be placed above the gravel pack to form a seal of from 2- to 3-feet in thickness, and the seal shall be completed using a bentonite grout mixture to the surface. Each well shall be provided with a surface grout seal and protective steel casing with locking cap. All wells shall be developed until they produce

clear, sand-free water. Each well shall be clearly numbered with exterior paint and be provided with three guard posts placed radially away from each well.

5. **Frederica Aquifer Wells:** Wells in the Frederica Aquifer shall be drilled using hydraulic rotary methods. Each ground-water monitoring well shall be constructed of 4-inch I.D. Schedule 80 PVC casing and screen. A 10-inch diameter borehole shall be drilled from the surface, through the surficial aquifer, and extended to the top of the Kirkwood confining layer. An 8-inch steel casing shall be placed in the borehole, and bentonite grout shall be tremied down the casing until grout rises to the surface in the annular space between the 8-inch casing and the borehole. While circulating the bentonite-grout mixture in the 8-inch casing, the 8-inch casing shall be driven at least 3 feet into the Kirkwood confining layer. All grout and drilling mud shall be evacuated from inside the casing. After the bentonite grout mixture has set for at least 24 hours, a 6-inch diameter borehole shall be extended through the confining layer and into the upper 15 feet of the Frederica Aquifer. The 4-inch I.D. Schedule 80 PVC casing and screen shall be installed and 15 feet of screen shall be set. The screened interval in each well shall consist of 0.010 inch slotted PVC screen depending upon the geologic findings during the drilling operation. The annulus of the screened interval shall be gravel packed with #1 grade gravel or equivalent, as determined in the field as suitable for the soil formation. The gravel pack shall extend to 2 feet above the top of the screen. Heavy bentonite mud or pellets shall be placed above the gravel pack to form a seal of from 2- to 3-feet in thickness, and the seal shall be completed using a bentonite grout mixture to the surface. Each well shall be provided with a surface grout seal and protective steel casing with locking cap. All wells shall be developed until they produce clear, sand-free water. Each well shall be clearly numbered with exterior paint and be provided with three guard posts placed radially away from each well.

6. **Well Point Installation:** Each well point shall be constructed of 2-inch I.D. steel with 3-foot, 0.010 inch slotted stainless steel screen. A 6-inch augered borehole shall be drilled to 10-feet below the surface (BLS). The well point and casing shall be driven down the borehole to 15-20 feet BLS such that the screen is at least 5 feet below the water table surface. The annular space between the 6-inch borehole and well point casing shall be sealed with heavy bentonite mud or pellets, and the seal shall be completed using a bentonite grout mixture to the surface. The well casing shall extend to 2.5 feet above land surface (ALS) and be provided with a cap and lock. All well points shall be developed until they produce clear, sand-free water. Each well point shall be clearly numbered with exterior paint and be provided with three guard posts placed radially away from each well point.

7. Ground-water monitoring wells shall comply with U.S. EPA publication 330/9-81-002 NEIC Manual for Groundwater/Subsurface Investigations at Hazardous Waste Sites, and State of Delaware requirements for monitoring well installation. All wells shall be developed, water levels measured, and locations surveyed and recorded on a site map. Only screw type joints shall be used. Glue fittings are not permitted.

8. All water samples shall be analyzed on site by the contractor for pH, temperature, and specific conductance. Sampling, maximum holding time,

and preservation of samples shall comply strictly with the following references: Standard Methods for the Examination of Water and Wastewater, 15th Ed. (1980), pp 35-42; ASTM, Section 11, Water and Environmental Technology; and Methods for Chemical Analysis of Waters and Wastes, EPA Manual 600/4-79-020, pp xiii to xix (1979). All water samples shall be analyzed using minimum detection levels, as specified in Attachment 1.

9. Field data collected for each site shall be plotted and mapped. The nature of contamination and the magnitude and potential for contaminant flow within each site to receiving streams and ground waters shall be determined or estimated. Upon completion of the sampling and analysis, the data shall be tabulated in the next R&D Status report, as specified in Item VI below.

10. The contractor shall split all water and soil samples. One set of samples shall be analyzed by the contractor and the other set of samples shall be forwarded for analysis through overnight delivery to:

USAF OEHL/SA  
Bldg 140  
Brooks AFB TX 78235

The samples sent to the USAF OEHL/SA shall be accompanied by the following information:

- (a) Purpose of sample (analyte)
- (b) Installation name (base)
- (c) Sample number (on containers)
- (d) Source/location of sample
- (e) Contract Task Numbers and Title of Project
- (f) Method of collection (bailer, suction pump, air-lift pump, etc.)
- (g) Volumes removed before sample taken
- (h) Special Conditions (use of surrogate standard, special nonstandard preservations, etc.)
- (i) Preservatives used

This information shall be forwarded with each sample by properly completing an AF Form 2752 (copy of form and instructions on proper completion mailed under separate cover). In addition, copies of field logs documenting sample collection should accompany the samples. Chain-of-custody records for all samples, field blanks, and quality control duplicates shall be maintained. All contractor QA/QC program analysis results shall be included in the analytical results of draft final report (as specified in Item VI below).

B. In addition to items delineated in A above, conduct the following specific actions at sites identified on Dover AFB DE:

1. Site T-1. IW Basins

a. Install four ground-water monitoring wells in the Columbia Aquifer. One well shall be located 100 feet upgradient of the basins and three wells shall be placed directly downgradient of the basins. Wells shall be an average of 50 feet in depth; total footage drilled shall not exceed 200 feet.

b. Install three ground-water monitoring wells into the Frederica Aquifer. One well shall be located 100 feet upgradient of the basins and two wells shall be placed downgradient of the basins and under the known Columbia Aquifer plume. Wells shall be an average of 80 feet in depth; total footage drilled shall not exceed 240 feet.

c. Collect one groundwater sample from each of the seven new wells and the three existing wells at the IW basins.

d. Each ground-water sample shall be analyzed for Volatile Organic Compounds (VOC), Oil and Grease-Infrared Method (O&G/IR), cyanide, phenols, Total Organic Halogens (TOX), Total Organic Carbons (TOC), and selected metals as specified in Attachment 1.

e. Collect two surface water and two sediment samples from the basins.

f. Each surface water and sediment sample shall be analyzed for VOC, O&G/IR, cyanide, phenols, TOX, TOC, and selected metals as specified in Attachment 1.

2. Site DD-1. North Drainage Ditch

a. Three soil borings shall be drilled at this site to a depth of 5 feet BLS. Each soil boring shall be located adjacent to a surface water and sediment sample location. Soil samples shall be collected with a hand auger. Soil samples shall be retained for analysis at 2-3 feet BLS and 4-5 feet BLS. A maximum of 6 samples shall be analyzed.

b. Each soil sample shall be analyzed for O&G/IR, cyanide, phenols, TOX, TOC, and the selected metals specified in Attachment 1.

c. Collect 8 surface water and 8 sediment samples from the North Drainage Ditch, with exact locations of sampling points dependent upon influent points along the Ditch. Sediment samples shall be taken from between .5-1.5 feet below the top of the sediment layer.

d. Each surface water and sediment sample shall be analyzed for O&G/IR, cyanide, phenols, TOX, TOC, and the selected metals specified in Attachment 1.

### 3. Site D-10. Sanitary Landfill

a. Install one upgradient and four downgradient ground-water monitoring wells into the Columbia Aquifer. Wells shall be installed at locations adjacent to the site. Wells shall be an average of 50 feet in depth; total footage drilled shall not exceed 250 feet.

b. Collect one ground-water sample from each well.

c. Each ground-water sample shall be analyzed for O&G/IR, cyanide, phenols, TOX, TOC, and the selected metals specified in Attachment 1.

### 4. Site D-4. Liquid Waste Disposal Site

a. Conduct additional reconnaissance activities to identify site boundaries. These activities shall consist of bringing DAFB personnel familiar with past disposal operations conducted at the site to the area to identify site location, taking soil samples with a hand auger to detect soil discoloration, odor, or waste material which will indicate past disposal operations, or conducting magnetometer surveys of the identified area in an effort to determine site location.

b. Install one upgradient and three downgradient ground-water monitoring wells into the Columbia Aquifer. Wells shall be installed at locations adjacent to the site. Wells shall be an average of 50 feet in depth; total footage drilled shall not exceed 200 feet.

c. Collect one ground-water sample from each well.

d. Each ground-water sample shall be analyzed for VOC, O&G/IR, cyanide, phenols, TOX, TOC, and the metals specified in Attachment 1.

### 5. Site FT-1. Fire Training Area 1

a. Conduct additional reconnaissance activities to identify site boundaries. These activities shall consist of bringing DAFB personnel familiar with past site operations to the area to identify site location, or contacting the engineering or construction organization responsible for golf course construction to review any available records which may indicate burn areas, area grading, or placement of fill material over site required to raise the land surface.

b. Install one upgradient and three downgradient ground-water monitoring wells into the Columbia Aquifer. Wells shall be installed at locations adjacent to the site. Wells shall be an average of 50 feet in depth; total footage drilled shall not exceed 200 feet.

c. Collect one ground-water sample from each well.

d. Each ground-water sample shall be analyzed for O&G/IR, TOX, TOC, and the selected metals specified in Attachment 1.

e. Collect one upstream surface water sample and one downstream surface water sample from the drainage ditch adjacent to the site.

f. Each surface water sample shall be analyzed for O&G/IR, TOX, TOC, and the selected metals specified in Attachment 1.

#### 6. Site FT-3. Fire Training Area 3

a. Install one upgradient and two downgradient ground-water monitoring wells in the Columbia Aquifer. Wells shall be installed at locations in the immediate vicinity of the site. Wells shall be an average of 50 feet in depth; total footage drilled shall not exceed 150 feet.

b. Collect one ground-water sample from each well.

c. Each ground-water sample shall be analyzed for O&G/IR, TOX, TOC, and the selected metals specified in Attachment 1.

d. Collect four surface water and four sediment samples from the streams and wetland areas adjacent to the site.

e. Each surface water sample shall be analyzed for O&G/IR, TOX, TOC, and the selected metals specified in Attachment 1.

#### 7. Site SP-4. JP-4 Pipeline Leak

a. Conduct additional reconnaissance activities to determine the exact location of the leak. This activity involves bringing DAFB personnel familiar with the JP-4 leak to the site to identify its location.

b. Install three well points at locations within the estimated spill area to a depth of at least 5 feet below the water table surface. Well points shall be installed to total depth of 15-20 feet BLS.

c. Collect one ground-water sample from each well point.

d. Each ground-water sample shall be analyzed for O&G/IR and TOC.

#### 8. Site D-5. Sanitary Landfill

a. Conduct additional reconnaissance activities to identify site boundaries. These activities shall involve bringing DAFB personnel familiar with past disposal operations conducted at the site to the area to identify the exact site location and taking soil samples with a hand auger to confirm landfill location through soil discoloration, odor, or waste material.

b. Install three downgradient ground-water monitoring wells into the Columbia Aquifer. Wells shall be installed at locations adjacent to the site. The upgradient well installed for Site D-4, Liquid Waste Disposal Site, shall serve as a source of upgradient water quality samples for both Site D-4 and Site D-5. Wells shall be an average of 50 feet in depth; total footage drilled shall not exceed 150 feet.

c. Collect one ground-water sample from each well.

d. The ground-water sample shall be analyzed for VOC, cyanide, phenols, TOX, TOC, and the metals specified in Attachment 1.

**9. Site FT-2. Fire Training Area 2**

a. Conduct additional reconnaissance activities to determine the exact location of the site. The activity shall consist of interviewing DAFB personnel familiar with past operations conducted on the site.

b. Install one wellpoint at the closest point suitable for drilling and downgradient from the site. Well point shall be driven to a depth of at least 3 feet below the water table surface and shall be installed to total depth of 15-20 feet BLS.

c. Collect one ground-water sample from the well point.

d. The ground-water sample shall be analyzed for O&G/IR, TOX, and TOC.

**10. Site S-1. Hazardous Waste Storage Yard**

a. Install one upgradient and three downgradient ground water monitoring wells into the Columbia Aquifer. Wells shall be installed in locations adjacent to the site. Wells shall be an average of 50 feet in depth; total footage drilled shall not exceed 200 feet.

b. Collect one ground-water sample from each well.

c. Each ground-water sample shall be analyzed for VOC, O&G/IR, cyanide, phenols, TOX, TOC, the selected metals specified in Attachment 1 and PCB's.

d. Two soil borings shall be drilled at this site to a depth of 5 feet BLS. The borings shall be located in areas immediately adjacent to the Storage Yard. Soil samples shall be collected with a hand auger. Soil samples shall be retained for analyses at 1-2 feet BLS and 4-5 feet BLS. A maximum of 4 samples shall be analyzed.

e. Each soil sample shall be analyzed for VOC, O&G/IR, cyanide, phenols, TOX, TOC, the selected metals specified in Attachment 1 and PCB's.

**11. Site XYZ. Main Fuel Pumping Manholes**

a. Install four well points around Building 950 to a depth of at least 3 feet below the water table surface. Well points shall be installed to total depth of 15-20 feet BLS.

b. Collect one ground-water sample from each well point.

c. Each ground-water sample shall be analyzed for O&G/IR and TOC.



d. Collect three surface water and three sediment samples from manholes in this area.

e. Each surface water and sediment sample shall be analyzed for O&G/IR and TOC.

## 12. Site D-2. Sanitary Landfill

a. Four soil borings shall be drilled at this site to a depth of 5 feet BLS. The borings shall be located in areas adjacent to the site. Soil samples shall be collected with a hang-auger. Soil samples shall be retained for analysis at 4-5 feet BLS. A maximum of 4 samples shall be analyzed.

b. Each soil sample shall be analyzed for O&G/IR, TOX, TOC, and selected metals specified in Attachment 1.

c. Collect four surface water and four sediment samples from wet areas adjacent to the site.

d. Each surface water and sediment sample shall be analyzed for O&G/IR, TOX, TOC, and selected metals specified in Attachment 1.

### C. Well Installation and Clean-up

The well and boring area shall be cleaned following the completion of each well and boring. Drill cuttings shall be removed and the general area clean. If hazardous waste is generated in the process of well installation, the contractor shall be responsible for proper containerization of drill cuttings for eventual government disposal. The contractor shall determine those drill cuttings suspected as being hazardous waste based upon discoloration, odor, or organic vapor detection instrument. The contractor shall test two samples of the suspected hazardous waste for EP Toxicity and Ignitability as specified in Attachment 1. Disposal of drill cuttings is not the responsibility of the contractor.

D. Results of all sampling and analysis shall be tabulated and incorporated in the Informal Technical Information report (Sequence 3, Atch 1 and Sequence 2, Atch 3 as specified in Item VI below) and forwarded to USAF OEHL/TS for review.

### E. Reporting

1. A draft report delineating all findings of this field investigation shall be prepared and forwarded to the USAF OEHL, as specified in Item VI below, for Air Force review and comment. This report shall include a discussion of the regional site specific hydrogeology, well and boring logs, data from water level surveys, water quality and soil analysis results, available geohydrologic cross sections, groundwater and gradient vector maps, and laboratory quality assurance information. The report shall follow the USAF OEHL format (mailed under separate cover).

2. The recommendation section will address each site and list them by categories. Category I will consist of sites where no further action, including remedial action, is required. Data for these sites are considered sufficient to rule out unacceptable health or environmental risks. Category II sites are those requiring additional monitoring or work to quantify or further assess the extent of current or future contamination. Category III sites are sites that will require remedial actions (ready for IRP Phase IV actions). In each case the contractor will summarize or present the results of field data, environmental or regulatory criteria, or other pertinent information supporting these conclusions.

#### **F. Cost Estimates**

The contractor shall provide cost estimates for all additional work recommended to permit proper determination of contaminants. The recommendations provided shall include all efforts required to determine the magnitude and direction of movement of discovered contaminants along with an estimate of the time required to accomplish the proposed effort. This information shall be provided in a separately bound appendix to the final report.

#### **G. Meetings**

The contractor's project leader shall attend one meeting with Air Force officials and regulatory agency representatives to present and discuss results of this investigation. This meeting shall take place at Dover AFB DE for eight hours at a time to be specified by the USAF OEHL.

#### **II. Site Location and Dates:**

Dover AFB DE  
Time and Dates  
To be established

#### **III. Base Support: None**

#### **IV. Government Furnished Property: None**

#### **V. Government Points of Contact:**

1. 1Lt Maria R. LaMagna  
USAF OEHL/TS  
Brooks AFB TX 78235  
(512) 536-2158  
AV 240-2158

2. Capt Lindsey C. Waterhouse  
USAF Hospital/SGPB  
Dover AFB DE 19902  
(302) 678-6605 Ext. 2598  
AV 455-6605 Ext. 2598

3. Lt Col Edwin C. Banner III  
HQ MAC/SGPB  
Scott AFB IL 62225  
(618) 256-2306  
AV 638-2306

VI. In addition to sequence numbers 1, 5 and 10 which are applicable to all orders, the reference numbers below are applicable to this order. Also shown are data applicable to this order:

<u>Sequence No.</u>	<u>Block 10</u>	<u>Block 11</u>	<u>Block 12</u>	<u>Block 13</u>	<u>Block 14</u>
Atch 1					
4	ONE/R	85 MAR 30	85 MAY 15	85 SEP 15	•
3	O/TIME	••	••		2
Atch 5					
2	O/TIME	••	••		2

\*Two draft reports will be required. After incorporating Air Force comments concerning the first draft report, the contractor shall supply the USAF OEHL with one copy of the second draft report. Upon USAF OEHL acceptance of the second draft report, the contractor shall distribute the remaining copies per a USAF OEHL prepared distribution list. The contractor shall supply the USAF OEHL with 20 copies of each draft report and 50 copies plus the original camera-ready copy of the final report.

••Upon completion

# Attachment 1

## Levels of Detection Required

Levels of Detection are for water unless shown otherwise:

Analyte	Analytical Method	Detection Limit	No. Samples
Oil and Grease (IR)	EPA 413.2	100 µg/L (waters); 100 µg/g (soil)	64 W; 35 S
Polychlorinated Biphenyls (PCB's)	EPA 608	0.25 µg/L (waters); 1 µg/g (soil)	4 W; 4 S
Phenols	EPA 420.1	1 µg/L (waters); 1 µg/g (soil)	36 W; 20 S
*Total Organic Carbon (TOC)	EPA 415.1	1000 µg/L	64 W; 35 S
*Total Organic Halogens (TOX)	EPA 9020	5 µg/L (waters); 5 µg/g (soil)	54 W; 32 S
Volatile Organic Compounds (VOC)		ee	23 W; 6 S
pH	EPA 150.1		64 W
Specific Conductance	EPA 120.1	1 µmho/cm	64 W
Arsenic (1)	EPA 206.2 or 206.3	10 µg/L	53 W; 32 S
Cadmium (1)	EPA 213.2	10 µg/L	53 W; 32 S
Chromium (1)	EPA 218.1	50 µg/L (waters); 5 µg/g (soil)	53 W; 32 S
Copper (2)	EPA 220.1	20 µg/L	53 W; 32 S
Cyanide	Standard 412	10 µg/L	36 W; 20 S
Iron (2)	EPA 236.1	100 µg/L	53 W; 32 S
Lead (1)	EPA 239.2	20 µg/L (waters); 2 µg/g (soil)	53 W; 32 S
Mercury (1)	EPA 245.1 and 245.5 (soils)	1 µg/L	53 W; 32 S
Nickel	EPA 249.1	100 µg/L	53 W; 32 S
Silver (1)	EPA 272.2	10 µg/L	53 W; 32 S
Zinc (2)	EPA 289.1	50 µg/L	53 W; 32 S
EP Toxicity	40 CFR 261.24	eee	2
Ignitability	40 CFR 261.21	eeee	2

\*Detection levels for TOX and TOC must be three times the noise level of the instrument. Laboratory distilled water must show no response. If so, correct of positive results must be made.

\*\*Determine limits for Volatile Organic Compounds shall be as specified for the compounds by EPA Methods 601-603. Method: Federal Register, Vol. 44, No. 233, pp 69468-69473. This method should be strictly followed including these items:

Item 1.4 - This method is recommended by EPA for use only by experienced resident analysts or under the close supervision of such qualified persons.

Item 2.2 - This is most important. If interferences are encountered (as in early peaks such as vinyl chloride), the method provides a secondary gas chromatographic column that will be helpful in resolving the compound of interest from interferences. This must be done in the case of vinyl chloride and so noted in analysis report.

Item 3.3 - 7.1-7.3 - These sections on interferences, contamination and QC should be strictly followed.

Item 3.3 - All samples must be analyzed within the recommended holding times. This must be followed without exception.

If questions are encountered about certain contaminants you may be asked to show both chromatograms used to rule out possible interferences.

\*\*\*Metal      mg/L of Solution

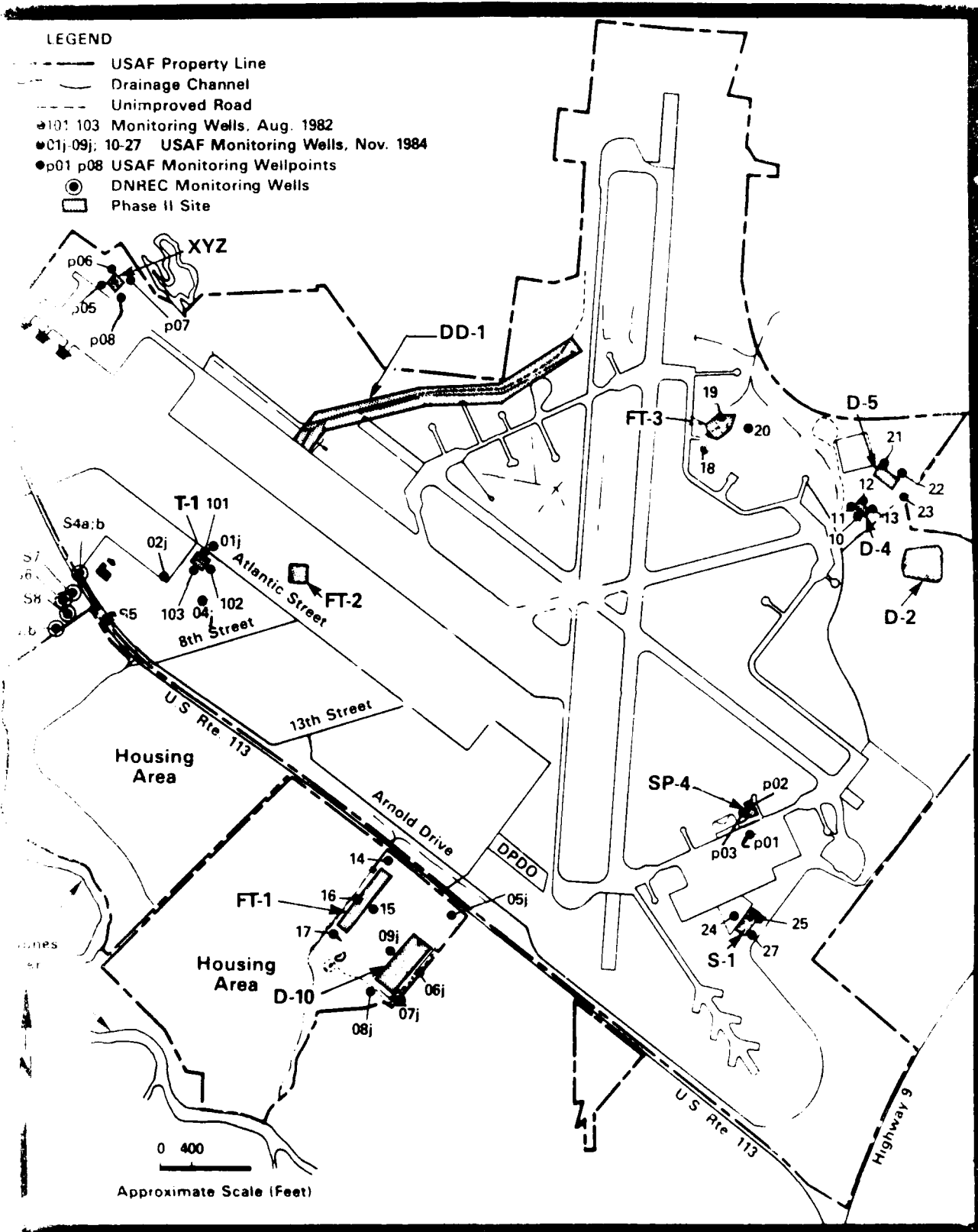
As	10
Ba	200
Cd	10
Cr	50
Pb	20
Hg	1
Se	10
Ag	10

\*\*\*\*Find if sample is ignitable at 140 degrees F or below. If so, it is a hazardous waste.

(1) = Primary Drinking Water Standard, 40 CFR 141.11.

(2) = Secondary Drinking Water Standard, 40 CFR 143.3.

APPENDIX C: Sample Locations  
and Identifications



**Figure C-1 Locations of Groundwater Monitoring Wells  
at Dover Air Force Base, December 1984**

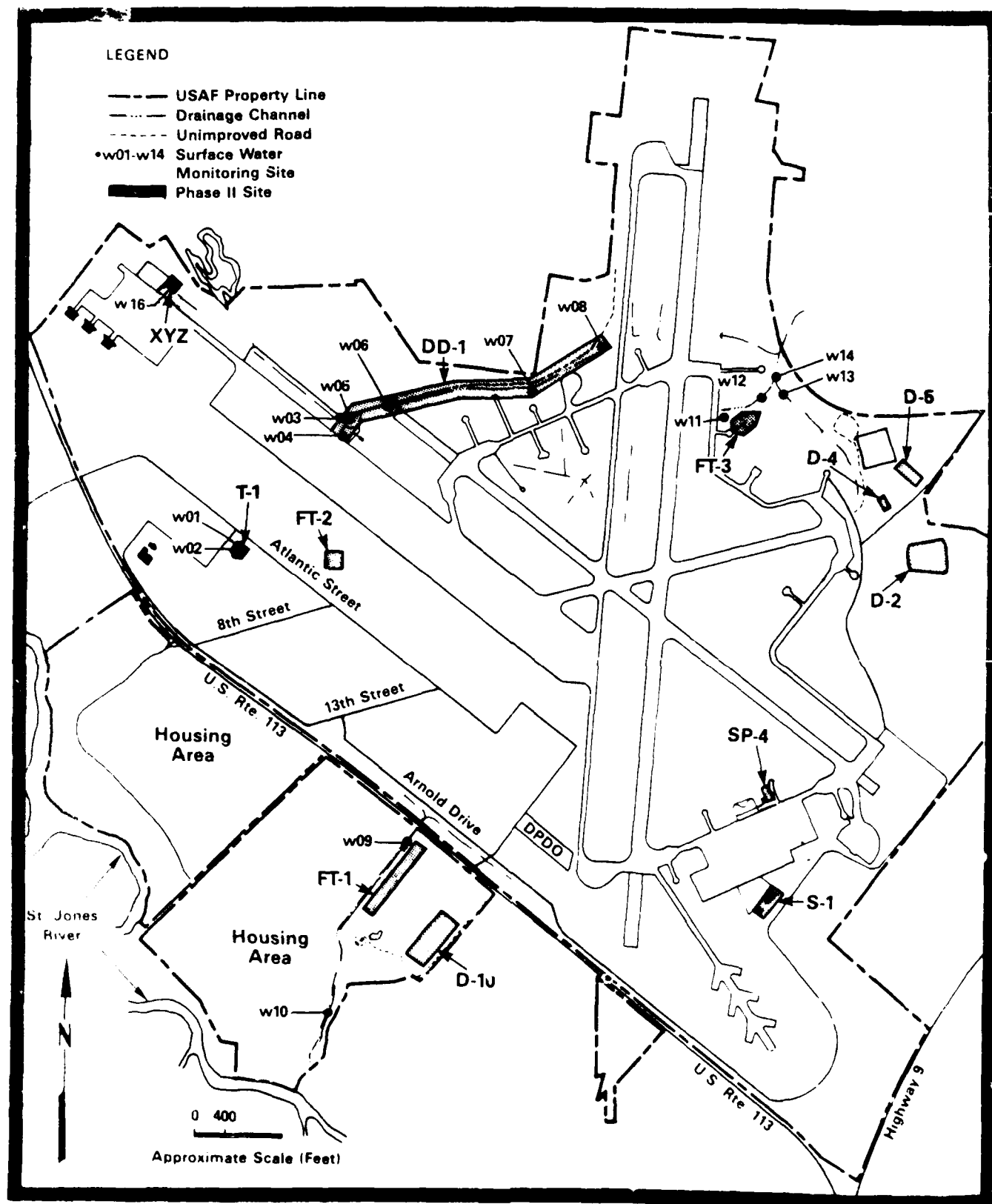
TABLE C-1

KEY TO SAIC/JRB SAMPLE NUMBER AND USAF SAMPLE NUMBERS  
GROUNDWATER SAMPLES

JRB NO.	USAF SAMPLING SITE IDENTIFIER	USAF BASE SAMPLE NO.	DATE SAMPLED <sup>1</sup>
MW01j	0052-PG-001	GP-84-0479	12/6/84 <sup>1</sup>
02j	0052-PG-002	GP-84-0480	12/6/84 <sup>1</sup>
04j	0052-PG-004	GP-84-0481	12/6/84 <sup>1</sup>
101	0052-PG-101	GP-84-0482	12/6/84 <sup>1</sup>
102	0052-PG-102	GP-84-0483	12/6/84 <sup>1</sup>
103	0052-PG-103	GP-84-0484	12/6/84 <sup>1</sup>
05j	0052-PG-005	GP-84-0470	12/4/84
06j	0052-PG-006	GP-84-0471	12/4/84
07j	0052-PG-007	GP-84-0472	12/4/84
08j	0052-PG-008	GP-84-0473	12/4/84
09j	0052-PG-009	GP-84-0474	12/4/84
10	0052-PG-010	GP-84-0463	11/29/84 <sup>1</sup>
11	0052-PG-011	GP-84-0464	11/29/84 <sup>1</sup>
12	0052-PG-012	GP-84-0465	11/29/84 <sup>1</sup>
13	0052-PG-013	GP-84-0466	11/30/84 <sup>1</sup>
14	0052-PG-014	GP-84-0475	12/4/84
15	0052-PG-015	GP-84-0476	12/4/84
16	0052-PG-016	GP-84-0477	12/4/84
17	0052-PG-017	GP-84-0478	12/4/84
18	0052-PG-018	GP-84-0495	12/11/84
19	0052-PG-019	GP-84-0496	12/11/84
20	0052-PG-020	GP-84-0497	12/11/84
21	0052-PG-021	GP-84-0467	11/30/84 <sup>1</sup>
22	0052-PG-022	GP-84-0468	11/30/84 <sup>1</sup>
23	0052-PG-023	GP-84-0469	11/30/84 <sup>1</sup>
24	0052-PG-024	GP-84-0498	12/11/84 <sup>1</sup>
25	0052-PG-025	GP-84-0499	12/11/84 <sup>1</sup>
27	0052-PG-027	GP-84-0500	12/11/84 <sup>1</sup>
p01	0052-PG-901	GP-84-0501	12/11/84
p02	0052-PG-902	GP-84-0502	12/11/84
p03	0052-PG-903	GP-84-0503	12/11/84
p05	0052-PG-905	GP-84-0485	12/6/84
p06	0052-PG-906	GP-84-0486	12/6/84
p07	0052-PG-907	GP-84-0487	12/6/84
p08	0052-PG-908	GP-84-0488	12/6/84

<sup>1</sup> Samples for volatile organics analysis for these locations collected between 2/18 and 2/22/85





**Figure C-2 Locations of Surface Water Monitoring at  
Dover Air Force Base, December 1984**

TABLE C-2

KEY TO SAIC/JRB SAMPLE NUMBERS AND USAF SAMPLE NUMBER  
SURFACE WATER SAMPLES

SAIC/ JRB NO.	USAF SAMPLING SITE IDENTIFIER	USAF BASE SAMPLE NO.	DATE SAMPLED
SW01	0052-NP-001	GN-84-0504	12/12/84 <sup>1</sup>
02	0052-NP-002	GN-84-0505	12/12/84 <sup>1</sup>
03	0052-NA-803	GN-84-0489	12/7/84
04	0052-NA-804	GN-84-0490	12/7/84
05	0052-NA-805	GN-84-0491	12/7/84
06	0052-NA-806	GN-84-0492	12/7/84
07	0052-NA-807	GN-84-0493	12/7/84
08	0052-NA-808	GN-84-0494	12/7/84
09	0052-NA-009	GN-84-0506	12/14/84
10	0052-NA-010	GN-84-0507	12/14/84
11	0052-NA-011	GN-84-0508	12/13/84
12	0052-NA-012	GN-84-0509	12/13/84
13	0052-NA-013	GN-84-0510	12/13/84
14	0052-NA-014	GN-84-0511	12/13/84
16	0052-NA-016	GN-84-0537	12/14/84

<sup>1</sup> Samples for volatile organics analysis for these locations collected between 2/18 and 2/22/85.

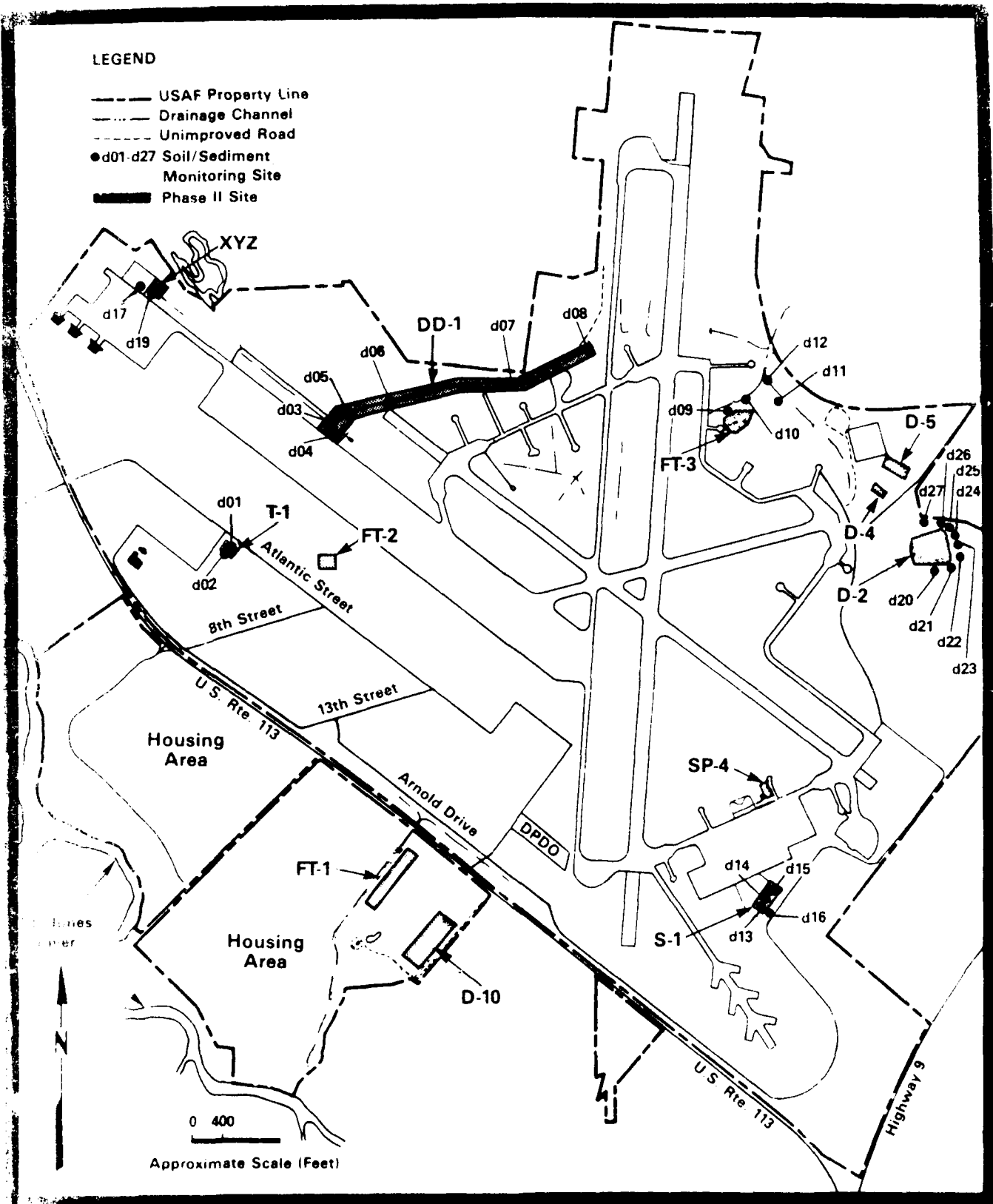


Figure C-3 Locations of Soil/Sediment Monitoring at  
Dover Air Force Base, December 1984

TABLE C-3

KEY TO SAIC/JRB SAMPLE NUMBERS AND USAF SAMPLE NUMBERS  
SOIL AND SEDIMENT SAMPLES

JRB NO.	USAF SAMPLING SITE IDENTIFIER	USAF BASE SAMPLE NO.	DATE SAMPLED
SD/SL 01	0052-SO-001	GL-84-0516	12/12/84
02	0052-SO-002	GL-84-0517	12/12/84
03	0052-SO-003	GL-84-0523	12/13/84
04	0052-SO-004	GL-84-0522	12/13/84
05	0052-SO-005	GL-84-0515	12/13/84
06	0052-SO-006	GL-84-0514	12/13/84
07	0052-SO-007	GL-84-0513	12/13/84
08	0052-SO-008	GL-84-0512	12/13/84
09	0052-SO-009	GL-84-0518	12/12/84
10	0052-SO-010	GL-84-0519	12/12/84
11	0052-SO-011	GL-84-0520	12/12/84
12	0052-SO-012	GL-84-0521	12/12/84
13	0052-SO-013	SL-84-0524	12/13/84
14	0052-SO-014	SL-84-0525	12/13/84
15	0052-SO-015	SL-84-0526	12/13/84
16	0052-SO-016	SL-84-0527	12/13/84
17	0052-SO-017	GL-84-0540	12/14/84
19	0052-SO-019	GL-84-0541	12/14/84
20	0052-SO-020	GL-84-0528	12/14/84
21	0052-SO-021	GL-84-0529	12/14/84
22	0052-SO-022	GL-84-0530	12/14/84
23	0052-SO-023	GL-84-0531	12/14/84
24	0052-SO-024	GL-84-0532	12/14/84
25	0052-SO-025	GL-84-0533	12/14/84
26	0052-SO-026	GL-84-0534	12/14/84
27	0052-SO-027	GL-84-0535	12/14/84

APPENDIX D: Well Logs

TABLE D-1

## SURVEYED WELL COORDINATES AND ELEVATIONS

WELL NO.	COORDINATES <sup>(1)</sup>		ELEVATION <sup>(2)</sup>	
	NORTH	EAST	TOP OF CASING	LAND SURFACE
01j	411,263.4367	480,911.5413	21.39	19.44
02j	410,877.47792	480,260.69905	27.56	25.56
04j	410,681.95314	480,574.42018	25.40	23.20
05j	406,437.10226	484,152.66353	20.07	17.97
06j	405,605.89494	483,596.82766	17.40	15.35
07j	405,380.78541	483,396.98990	12.57	10.37
08j	405,582.8578	483,128.81236	14.20	12.50
09j	405,999.38374	483,448.94564	16.35	14.63
10	411,990.09969	489,274.84199	22.38	19.40
11	412,156.27189	489,330.03312	21.76	19.75
12	412,151.27359	489,423.92440	21.81	19.74
13	412,076.35991	489,441.33724	22.97	20.36
14	407,248.25277	483,347.51028	21.16	19.12
15	406,487.84036	483,018.25204	11.11	9.21
16	406,624.19895	482,807.17974	10.57	8.49
17	406,274.54671	482,630.46770	10.27	8.40
18	412,818.72363	487,417.78847	19.73	18.13
19	413,144.13525	487,643.98453	16.27	14.42
20	413,104.03656	487,854.71962	12.34	10.39
21	412,488.10025	489,590.92886	18.03	16.06
22	412,474.07947	489,879.96914	20.19	18.23
23	412,283.55836	489,935.34389	21.39	19.44
24	406,610.07279	487,952.89072	25.61	23.68
25	406,593.12117	488,217.56986	26.82	24.52
27	406,337.84156	488,016.30056	24.21	22.21
p01	407,837.86021	488,082.99658	28.02	25.92
p02	407,954.35868	488,123.87030	27.35	25.35
p03	407,815.61917	487,908.53666	26.99	25.79
p05	414,635.23693	479,552.02097	24.87	22.87
p06	414,692.70575	479,646.04471	28.87	26.87
p07	414,615.69372	479,826.02983	26.18	23.58
p08	414,372.82135	479,746.88764	26.84	24.84

(1) Delaware state grid system

(2) Feet mean sea level

**WELL CONSTRUCTION SUMMARY**Project: Dover AFB Owner: U.S. Air Force Well No.: MWP-01**Drilling Summary:**

Total Depth: 17.0' Drillers: Gary Truver  
Borehole Diameter's: 6" Walton Corporation  
Rig Type: CME Auger  
Elevation: Land Surface: 25.92' Bits: Hollow Stem Auger  
Top of Casing: 28.02' Drilling Fluid Type: None  
Supervisory Geologist: R. Eades Amount Use: \_\_\_\_\_  
Log Book No. 5 pp. 10-13, Water Level: 12.5' (11/6/84)

**Well Design:**

Casing: Material: Steel Screen: Material: Stainless Steel  
Diameter: 2" ID 2 1/4" OD Diameter: 2"  
Length: 16.0' Slot: 0.01" 10 Slot/Inch  
Filter: Material: 40 Sand Setting: 13.5-16.5'  
Setting: 11.5-17.0' Seals: Type: Bentonite Pellets  
Grout: Type: #1 Portland Cement Setting: 9.5-11.5'  
Setting: LS-9.5' Surface Casing: Steel  
Other: \_\_\_\_\_

**Time Log:****Started****Completed**

Drilling:	<u>11/6/84</u>	<u>0910 hr</u>	<u>11/6/84</u>	<u>1335 hr</u>
Installation:	<u>11/6/84</u>	<u>1350 hr</u>	<u>11/6/84</u>	<u>1420 hr</u>
Water Level Reading:			<u>11/6/84</u>	<u>1040 hr</u>
Development:				

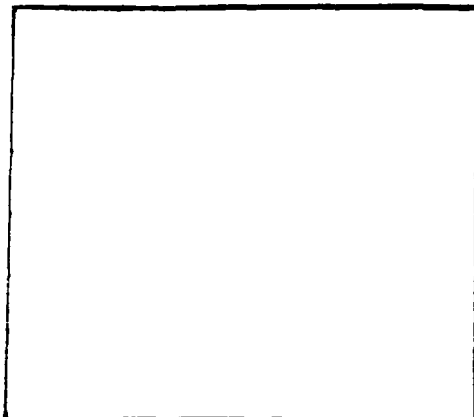
**Well Development:**Method/Equipment: Compressed air blown; bailed.

# JRB ASSOCIATES

A Company of Science Applications, Inc.  
8400 Westpark Drive, McLean, Virginia 22102

## DRILLING LOG

Project: Dover AFB Owner: US Air Force Well No.: MWP-01



Site Sketch

Location: Site SP-4 Field Book No.: 5 pp 10-13

Building 1310 Area Log By: Richard Eades

Driller: Gary Truver

Rig Type: CME Auger

### Reference

Point: Land Surface

Total  
Depth: 17.0'

### Reference

Point

Elevation: 25.92'

Date Time

Drilling Started: 11/6/84 0910 hr

Drilling Completed: 11/6/84 1335 hr

Water Level: 11/6/84 1040 hr

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	DESCRIPTION
				C=Cuttings
0-2'		C		BLS Dark grayish brown silt, some clay, trace sand; gravel layer at approximately 1.5' BLS.
2-4'		C		BLS Medium to light brown sand, some silt and gravel, trace clay.
4-7'		C		BLS Same as above.
7-9.5'		C		BLS Medium yellow to reddish brown silt, some sand.
9.5-10'				BLS Dark brown clay some silt.



Page 2 of 2

# JRB ASSOCIATES

A Company of Science Applications, Inc.  
8400 Westpark Drive, McLean, Virginia 22102

## WELL CONSTRUCTION SUMMARY

Project: Dover AFB Owner: U.S. Air Force Well No.: 10

### Drilling Summary:

Total Depth: 17.0' Drillers: Gary Truver  
Borehole Diameter(s): 6" Walton Corporation  
Rig Type: CME Auger  
Elevation: Land Surface: 25.35' Bit(s): Hollow Stem Auger  
Top of Casing: 27.35' Drilling Fluid Type: None  
Supervisory Geologist: R. Eades Amount Use:   
Log Book No. 5 pp. 14-15 Water Level: 12.5' BLS 11/6/84

### Well Design:

Casing: Material: Steel Screen: Material: Stainless Steel  
Diameter: 2" ID 2 1/4" OD Diameter: 2"  
Length: 16.0' Slot: 0.01" 10 Slot/Inch  
Filter: Material: 40 Sand Setting: 13.5-16.5'  
Setting: 11.3-13.0' Seals: Type: Bentonite Pellets  
Grout: Type: #1 Portland Cement Setting: 9.3-11.3'  
Setting: LS-9.4' Surface Casing: Steel  
Other: Formation allowed to cave, providing natural sand pack  
from 13.0-17.0'

### Time Log:

#### Started

#### Completed

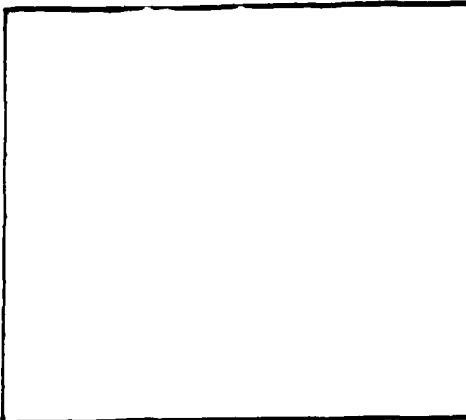
Drilling:	<u>11/6/84 1052 hr</u>	<u>11/6/84 1448 hr</u>
Installation:	<u>11/6/84 1450 hr</u>	<u>11/6/84 1530 hr</u>
Water Level Reading:	<u></u>	<u>11/6/84 1106 hr</u>
Development:	<u></u>	<u></u>

### Well Development:

Method/Equipment: Compressed Air Blown; Bailed.

**DRILLING LOG**

**Project:** Dover AFB **Owner:** US Air Force **Well No.:** WWP-02



Site Sketch





**Location:** Site SP-4 **Field Book No.:** 5 pp 14-15  
Building 1310 Area **Log By:** Richard Eades  
**Driller:** Gary Truver  
**Rig Type:** CME Auger  
**Reference Point:** Land Surface **Total Depth:** 17.0'

**Reference Point Elevation:** 25.35' **Date** 11/6/84 **Time** 1052 hrs  
**Drilling Started:** 11/6/84 1448 hrs  
**Drilling Completed:** 11/6/84 1106 hrs  
**Water Level:** 11/6/84

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	DESCRIPTION
				C=Cuttings
0'		C		0-2.5' BLS Light brown fine sand, some silt, trace clay, trace gravel.
2'		C		2.5-4.0' BLS Dark brown to dark grayish brown sand, some silt.
4'		C		4.0-7.5' BLS Medium grayish brown silt, some clay.
6'				
8'		C		7.5-8.5' BLS Light gray sand.
10'		C		8.5-11.0' BLS Light grayish brown to medium brown silt and clay.

**DRILLING LOG**

SRP-021

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
10'				
11'				
12'		C		11.5-12.5' BLS Gravel layer, moist at approximately 12.5' BLS.
13'				12.5-14' BLS No cutting returned.
14'		C		14.0-17.0' BLS Light to medium gray silt, some clay.
15'				
16'				
17'				
18'				
19'				
20'				
21'				
22'				
23'				
24'				
25'				
26'				
27'				
28'				
29'				
30'				
31'				
32'				
33'				
34'				
35'				
36'				
37'				
38'				
39'				
40'				
41'				
42'				
43'				
44'				
45'				
46'				
47'				
48'				
49'				
50'				

## WELL CONSTRUCTION SUMMARY

Project: Dover AFB Owner: U.S. Air Force Well No.: WTP-114

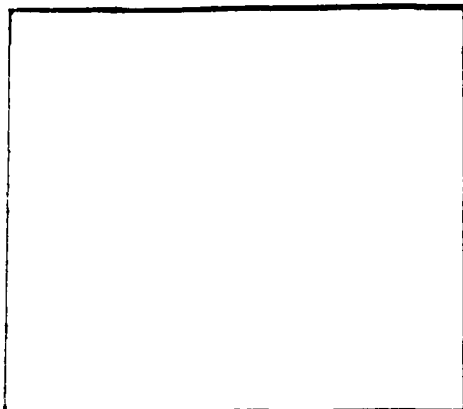
	<b>Drilling Summary:</b>		
	Total Depth: <u>17' BLS</u>	Drillers: <u>Gary Truver (Walton)</u>	
	Borehole Diameters: <u>6 1/2"</u>	<u>Calvin Wallace (Delmarva)</u>	
	Rig Type: <u>CME-55/Failing 1250</u>		
	Elevation: Land Surface: <u>25.79'</u>	Bits: <u>Auger/Drill</u>	
	Top of Casing: <u>26.99'</u>	Drilling Fluid Type: <u>Water/Bentonite</u>	
	Supervisory Geologist: <u>Andris Lapins</u>	Amount Use: <u></u>	
	Log Book No. <u>2</u> pp. <u>42-50</u>	Water Level: <u></u>	
	<b>Well Design:</b>		
	Casing: Material: <u>Steel</u>	Screen: Material: <u>Stainless Steel</u>	
	Diameter: <u>2"</u> ID <u>2 1/4"</u> OD	Diameter: <u>2"</u>	
	Length: <u>16'</u>	Slot: <u>.010", 10 Slot/Inch</u>	
	Filter: Material: <u>40 Sand</u>	Setting: <u>14-17' BLS</u>	
	Setting: <u>11.5-17' BLS</u>	Seals: Type: <u>Bentonite Pellets</u>	
	Grout: Type: <u>#1 Portland Cement</u>	Setting: <u>8.4-11.5' BLS</u>	
	Setting: <u>LS-8.4' BLS</u>	Surface Casing: <u>Steel</u>	
	Other: <u></u>		
	<b>Time Log:</b>		
		Started	Completed
	Drilling:	<u>11/6/84 0910 hrs</u>	<u>11/6/84 1343 hrs</u>
	Installation:	<u>11/6/84 1415 hrs</u>	<u>11/6/84 1500 hrs</u>
	Water Level Reading:	<u></u>	<u></u>
	Development:	<u></u>	<u></u>
	<b>Well Development:</b>		
	Method/Equipment:	<u>Compressed Air Blowing Method</u>	
		<u></u>	
		<u></u>	
		<u></u>	

# JRB ASSOCIATES

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8400 Westpark Drive, McLean, Virginia 22102

## DRILLING LOG

Project: Dover AFB Owner: US Air Force Well No.: 1WNP-03

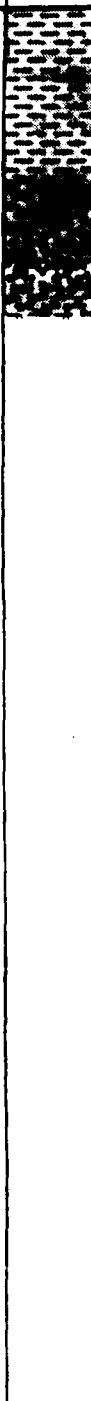


Site Sketch

Location: Site SP-4 Field Book No.: 2 pp 42-43  
Building 1310 Area Log By: Andris Lapins  
 Driller: Calvin Wallace (Deimer)  
 Rig Type: CME-55 Failing 1250  
 Reference Point: Land Surface Total Depth: 17 BLS

Reference Point Elevation: 25.79' Date Time  
 Drilling Started: 11/6/84 091  
 Drilling Completed: 11/6/84 13-  
 Water Level:                     

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	DESCRIPTION
0-3'	BLS	Dark brown silty fine sand, trace clay and gravel; heavy gravel layer at @ 0.5' BLS; moist.		
3-4'	BLS	Olive gray silty clay, trace fine sand; soft; moist.		
4-5'	BLS	Very dark gray to black silty fine sand; trace clay; moist.		
5-8'	BLS	Olive gray very fine sand, some silt, trace clay; moist.		
8-9'	BLS	Light gray silty clay, trace very fine sand; dark brown to yellow mottling; soft; moist.		
9-10'	BLS	Pale yellow silty clay, trace very fine sand; soft; moist.		

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
10'		CUTTINGS		10-12' BLS    Dark olive gray silty clay; soft; moist.
12'				12-13.5' BLS    Dark gray silty clayey medium to coarse sand; wet
				to saturated.    Small gravel seam at @ 13' BLS.
				Water table estimated at @ 12' BLS.
14'				
16'				
18'				
20'				
22'				
24'				
26'				

## WELL CONSTRUCTION SUMMARY

Project: Dover AFB Owner: U.S. Air Force Well No.:       

### Drilling Summary:

Total Depth: 15.0' Drillers: Gary Truher  
Borehole Diameter(s): 6" Walton Corporation  
Rig Type: CME Auger  
Elevation: Land Surface: 22.87' Bit(s): Hollow Stem Auger  
Top of Casing: 24.87' Drilling Fluid Type: None  
Supervisory Geologist: R. Eades Amount Use:         
Log Book No. 5 pp. 25-27 Water Level: 7.6' BLS 11/7/84

### Well Design:

Casing: Material: Steel Screen: Material: Stainless Steel  
Diameter: 2" ID 2 1/4" OD Diameter: 2"  
Length: 19.5' Slot: 0.01" 10 Slot/Inch  
Filter: Material: #1 Well Gravel Setting: 11.5-14.5'  
Setting: 9.0-14.5' Seals: Type: Bentonite Pellets  
Grout: Type: #1 Portland Cement Setting: 6.0-9.0'  
Setting: LS-6.0' Surface Casing: Steel  
Other:       

### Time Log:

#### Started

#### Completed

Drilling:	<u>11/07/04</u>	<u>1214 hr</u>	<u>11/07/84</u>	<u>1230 hr</u>
Installation:	<u>11/07/84</u>	<u>1232 hr</u>	<u>11/07/84</u>	<u>1300 hr</u>
Water Level Reading:	<u>      </u>	<u>      </u>	<u>11/07/84</u>	<u>1310 hr</u>
Development :	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>

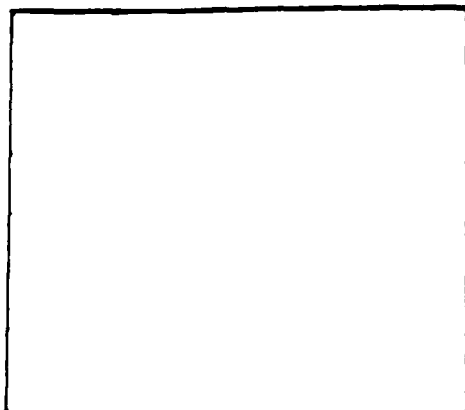
### Well Development:

Method/Equipment: Compressed Air Blown; Bailed.



**DRILLING LOG**

Project: Dover AFB Owner: US Air Force Well No.: NWP-05



Site Sketch

Location: Main Fuel Field Book No.: 5 pp 25-27  
Pump Station Log By: Richard Eades  
 Driller: Gary Truver  
 Rig Type: CME Auger  
Reference Point: Land Surface Total Depth: 15.0'

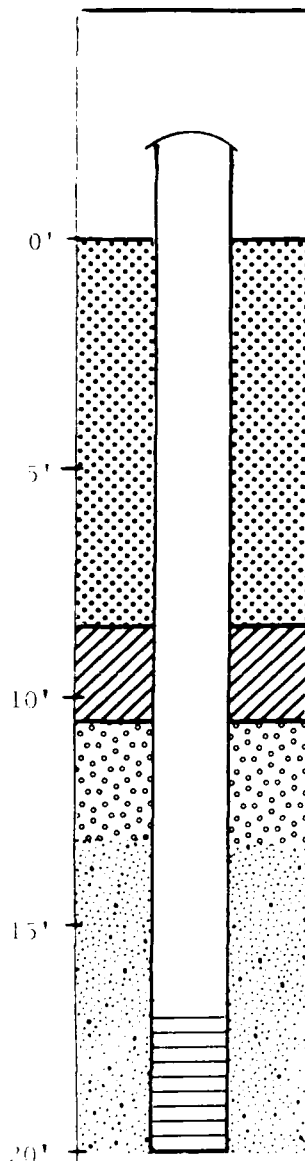
Reference Point Elevation: 22.87' Date Time  
Drilling Started: 11/7/84 1214 hr  
Drilling Completed: 11/7/84 1230 hr  
Water Level: 7.6' BLS 11/7/84 1310 hr

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	DESCRIPTION
				C= Cuttings
0'		C		0-3' BLS Medium brown fine sand, some silt, some gravel, trace clay.
2'				
4'		C		4-7' BLS Dark brownish to dark gray fine sand, some silt; gravel layer at approximately 6.5' BLS.
6'				
8'		C		7-12' BLS Medium gray sand, some silt, trace clay.
10'				

Page 2 of 2

**WELL CONSTRUCTION SUMMARY**

Project: Dover AFB Owner: U.S. Air Force Well No.: 12P-06



**Drilling Summary:**

Total Depth: 20.5' Drillers: Gary Truver  
Borehole Diameter's : 6" Walton Corporation  
Rig Type: C/E Auger  
Elevation: Land Surface: 26.87' Bits: Hollow Stem Auger  
Top of Casing: 28.87' Drilling Fluid Type: None  
Supervisory Geologist: R. Eides Amount Use: \_\_\_\_\_  
Log Book No. 5 pp. 22-24 Water Level: 12.0' BLS 11/7/84

**Well Design:**

Casing: Material: Steel Screen: Material: Stainless Steel  
Diameter: 2" ID 2 1/4" OD Diameter: 2"  
Length: 14.0' Slot: 0.01" 10 Slot/inch  
Filter: Material: 40 Sand Setting: 17.0-20.0'  
Setting: 10.5-13.0' Seals: Type: Bentonite Pellets  
Grout: Type: #1 Portland Cement Setting: 8.5-10.5'  
Setting: LS-8.5' Surface Casing: Steel  
Other: Formation allowed to cave from 12.0-20.5' BLS

**Time Log:**

**Started**

**Completed**

Drilling:	11/7/84	1011 hr	11/7/84	1100 hr
Installation:	11/7/84	1112 hr	11/7/84	1150 hr
Water Level Reading:			11/7/84	1310 hr
Development:				

**Well Development:**

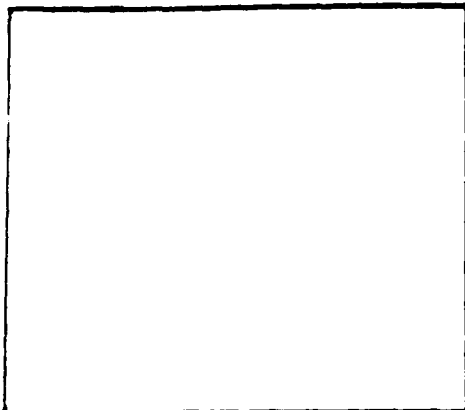
Method Equipment: Compressed Air / Kelly / Bailers  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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## DRILLING LOG

Project: Dover AFB Owner: US Air Force Well No.: MDP-06



Site Sketch

Location: Main Fuel Field Book No.: 5 pp 22-24  
Pump Station Log By: Richard Eades  
Bldg. 950 Driller: Gary Trover  
 Rig Type: CME Auger  
 Reference Point: Land Surface Total Depth: 20.5'

Reference Point Elevation: 26.87' Date Time  
 Drilling Started: 11/7/84 1011 hr  
 Drilling Completed: 11/7/84 1100 hr  
 Water Level: 11/7/84 1310 hr

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (bl)	C=Cuttings DESCRIPTION
0'		C		0-3' BLS Medium yellowish brown fine sand, some silt, trace clay.
2'		C		3-9' BLS Light brown grading downward to light grayish brown, fine sand, some silt.
4'				
6'				
8'				
10'		C		9-14' BLS Medium to light yellow brown, fine to medium sand, trace silt; moist at approximately 13.0' BLS.

**DRILLING LOG**

MSP-96 cont.

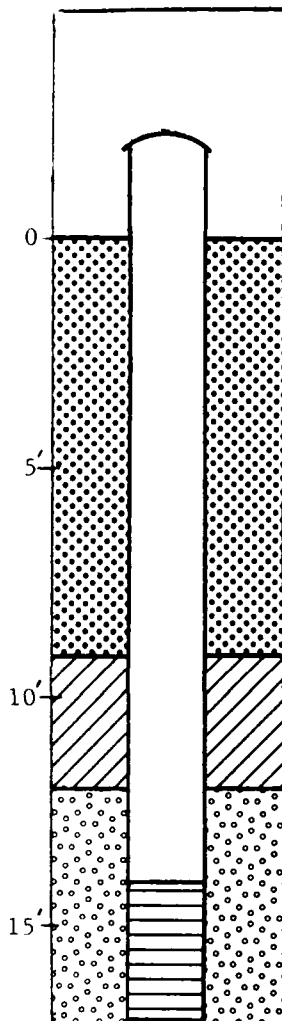
Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
10'				
12'				
14'		C		14-19' BLS Light brown coarse to medium sand, some fine
				sand; very wet at 16.5' BLS.
16'				
18'				
20'				19-20.5' BLS No cuttings returned.
24'				
26'				

# JRB ASSOCIATES

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## WELL CONSTRUCTION SUMMARY

Project: Dover AFB Owner: U.S. Air Force Well No.: WEP-1



### Drilling Summary:

Total Depth: 17' BLS Drillers: Calvin Wallace  
Borehole Diameter(s): 6 1/2" Delmarva Drilling  
Rig Type: Failing 1250 Hydraulic Rotary  
Elevation: Land Surface: 23.61' Bit(s): Drag  
Top of Casing: 26.18' Drilling Fluid Type: Water/Bentonite  
Supervisory Geologist: Andris Lapins Amount Use: @ 50 gals.  
Log Book No. 2 pp. 50-55 Water Level: 7.15' BLS 11/14/84

### Well Design:

Casing: Material: Steel Screen: Material: Stainless Steel  
Diameter: 2" ID 2 1/4" OD Diameter: 2"  
Length: 16' Slot: 0.010; 10/inch  
Filter: Material: 4Q Sand Setting: 14-17' BLS  
Setting: 12-17' BLS Seals: Type: Bentonite  
Grout: Type: #1 Portland Cement/Ben Setting: 8.9-12' BLS  
Setting: LS-8.9' BLS Surface Casing: Steel  
Other: Protective steel casing cemented in to land surface.

### Time Log:

#### Started

#### Completed

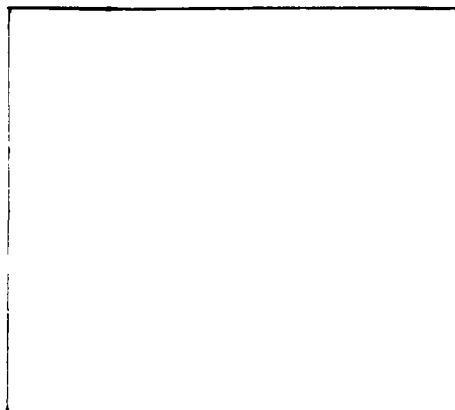
Drilling:	<u>11/7/84</u>	<u>0857 hrs</u>	<u>11/7/84</u>	<u>0910 hrs</u>
Installation:	<u>11/7/84</u>	<u>0920 hrs</u>	<u>11/7/84</u>	<u>1010 hrs</u>
Water Level Reading:			<u>7.15' BLS 11/14/84</u>	
Development :				

### Well Development:

Method/Equipment: Compressed Air Blown; Bailed.

**DRILLING LOG**

Project: Dover AFB Owner: U.S. Air Force Well No.: 12AP-07



Site Sketch

Location: \_\_\_\_\_ Field Book No.: 2 pp 50-55  
XYZ- Fuel Storage Area Log By: Andris Lapins  
\_\_\_\_\_  
Driller: Calvin Wallace (Delmarva)  
\_\_\_\_\_  
Rig Type: Failing 1250  
Hydraulic Rotary

Reference Point: Land Surface Total Depth: 17' BLS

Reference Point Elevation: 23.61' Date 11/7/84 Time 0830hrs  
Drilling Started: 11/7/84 0830hrs  
Drilling Completed: 11/7/84 0910  
Water Level: 7.15' BLS 11/14/84

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	Legend	DESCRIPTION	Gradation
				SI: Sampling Interval RE: Recovery SS: Split Spoon C: Cuttings		Trace 1-12" Little 12-20" Some 20-30" Add "Y" 30"
0						
5		C			Pale yellow fine to medium sand, some silt.	
					Faint hydrocarbon odor emanating from borehole at @ 6' bLS.	
10						

# DRILLING LOG

MAP-07 cont.

[illegible]



# JRB ASSOCIATES

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## WELL CONSTRUCTION SUMMARY

Project: Dover AFB Owner: U.S. Air Force Well No.: WCP-08

### Drilling Summary:

Total Depth: 18.0' Drillers: Gary Traver  
Borehole Diameters: 6" Walton Corporation  
Rig Type: GME Auger  
Elevation: Land Surface: 24.84' Bits: Hollow Stem Auger  
Top of Casing: 26.84' Drilling Fluid Type: None  
Supervisory Geologist: R. Eades Amount Use:   
Log Book No. 5 pp. 19-21 Water Level: 9.2' 11/7/84

### Well Design:

Casing: Material: Steel Screen: Material: Stainless Steel  
Diameter: 6" ID 3 1/2" OD Diameter: 2"  
Length: 17.0' Slot: 0.01 10 Slot/Inch  
Filter: Material: 40 Sand Setting: 14.5-17.5'  
Setting: 12.0-18.0' Seals: Type: Bentonite Pellets  
Grout: Type: #1 Portland Cement Setting: 6.5-8.5'  
Setting: LS-6.5' Surface Casing: Steel  
Other: Formation caved above sand pack from 8.5-12.0'

### Time Log:

#### Started

#### Completed

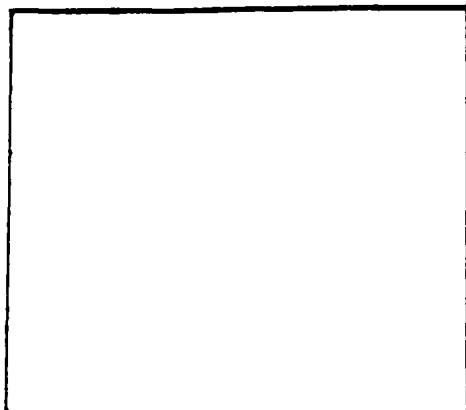
Drilling:	11/7/84	0835 hr	11/7/84	0855 hr
Installation:	11/7/84	0920 hr	11/7/84	0955 hr
Water Level Reading:			11/7/84	1305 hr
Development:				

### Well Development:

Method Equipment: Compressed Air Blown, Bail

**DRILLING LOG**

**Project:** Dover AFB **Owner:** US Air Force **Well No.:** AMP-08



Site Sketch

**Location:** Main Fuel Pump Station **Field Book No.:** 5 pp 19-21

**Log By:** Richard Eades

**Driller:** Gary Truter

**Rig Type:** CME Auger

**Reference Point:** Land Surface **Total Depth:** 18.0'

**Reference Point Elevation:** 24.28' **Date** 11/7/84 **Time** 0835 **hr**

**Drilling Started:** 11/7/84 0835 **hr**

**Drilling Completed:** 11/7/84 0855 **hr**

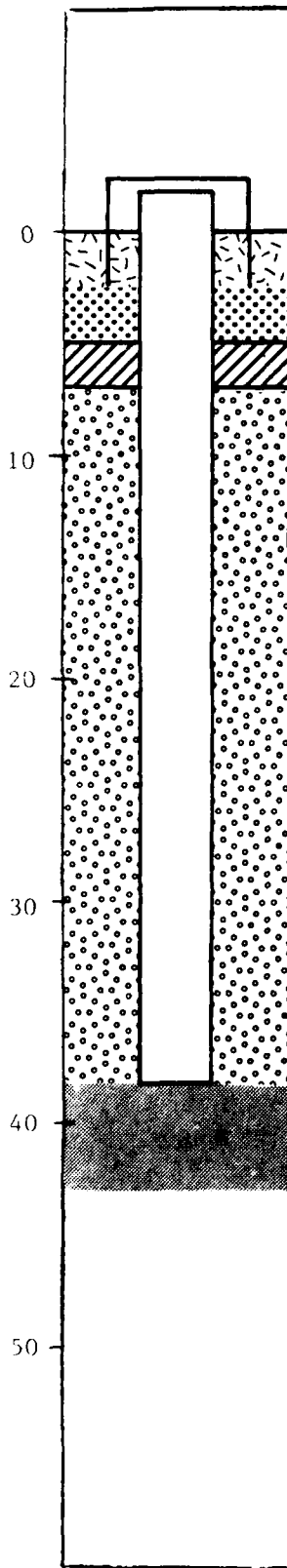
**Water Level:** 11/7/84 1305 **hr**

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	DESCRIPTION
				C=Cuttings
0'		C		0-4' BLS Medium brown grading downward to dark brown silt, some sand, some clay.
2'				
4'		C		4-8' BLS Medium gray brown sand, some silt, moist at 6.5' BLS.
6'				
8'		C		8-8.5' BLS Gravel layer.
		C		8.5-11' BLS Light blueish gray sand, some silt.
10'				

2300

**WELL CONSTRUCTION SUMMARY**

Project: Dover AFB Owner: U.S. Air Force Well No.: 26-1



**Drilling Summary:**

Total Depth: 38' Drillers: Calvin Wallace  
 Borehole Diameter(s): 6" Delmarva Drilling  
Failing 1250  
 Rig Type: Hydraulic Rotary  
 Elevation: Land Surface: 19.44' Bit(s): Drag  
 Top of Casing: 21.39' Drilling Fluid Type: Water  
 Supervisory Geologist: Richard Eades Amount Use:   
 Log Book No. 4 pp. 93-105 Water Level: 10.9' 11/14/84

**Well Design:**

Casing: Material: PVC Screen: Material: PVC  
 Diameter: 2" ID 2 3/8"OD Diameter: 2"  
 Length: 11' Slot: 0.010; 5/16 inch  
 Filter: Material: 4Q Sand Setting: 9'-38'  
 Setting: 7'-38' Seals: Type: Bentonite  
 Grout: Type: #1 Portland Cement/Ben Setting: 5'-7'  
 Setting: LS-5.0' Surface Casing: Steel/PVC  
 Other: Protective steel casing cemented in to land surface.

**Time Log:**

**Started**

**Completed**

	Started	Completed
Drilling:	10/31/84 1020 hrs	10/31/84 1200 hrs
Installation:	10/31/84 1300 hrs	10/31/84 1500 hrs
Water Level Reading:		11/14/84 1510 hrs
Development :		

**Well Development:**

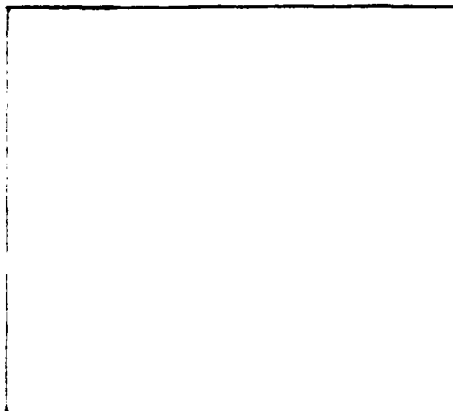
Method/Equipment: Air Blown Minimum 4 hours, pumped at  
10 gpm minimum 4 hours and until clear.

## DRILLING LOG

Project: Dover AFB

**Owner:** U.S. Air Force

Well No.: MW-01 i



### Site Sketch

Location: Industrial Field Book No.: 4 pp93-105

Waste Basins Log By: Rick Eades

Driller: Calvin Wallace

Failing 1205

Rig Type: Falling 1205  
Hydraulic Rotary

### Reference

Total

Point: Land Surface

Depth: 38'

## Reference

Date Time

Point

Elevation: 19.44'

Drilling Started:10/31/84 1020hr

Drilling Completed:10/31/84 1200

Water Level: 10.9' 11/14/84 1510

[illegible]

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
10		SS#2	7	SI: 10-12' BLS RE: 1.2'
			8	1.3' - Light gray (5YR 7/1) coarse to medium sand,
			10	some fine sand, trace silt, trace clay, trace
			13	pebbles.
		C		Brown, coarse sand and pebbles, some medium sand, trace silt.
		SS#3		SI: 15-17' BLS RE: 1.1'
			8	1.1' - Dark orange brown (10YR 5/6) fine to medium
			15	sand, some silt, trace clay, trace pebbles.
			16	
			20	
		SS#4		SI: 20-22' BLS RE: 1.1'
			11	1.1' - Dark orange brown (10YR 5/6) medium sand,
			14	some fine sand, trace clay, trace pebbles.
			10	
			15	
		C		Medium to light brown, coarse to medium sand, trace silt,
				sand, some pebbles.

DRILLING LOG

MC-011

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
25		SS#5	13	SI: 25-27' BLS RE: 1.1'
			14	1.1' - Medium orange brown (10YR 6/8) fine to medium
			8	sand, some silt, trace clay, thin black laminations
			13	in interval.
		C		Brown, coarse to medium sand, trace silt.
30		SS#6		SI: 30-32' BLS RE: 1.7'
			11	1.7' - Medium to dark orange brown (10YR 5/6) with thin
			17	black laminations, medium sand, some coarse sand,
			23	trace silt, trace clay.
			26	
		C		Light brown medium to fine sand, some silt, trace clay.
35		SS#7		SI: 35-37' BLS RE: 1.3'
			28	1.3' - Medium to dark reddish brown (10YR 5/6) coarse to
			24	medium sand, some fine sand, some pebbles, trace
			23	silt.
			24	
		C		Reddish brown, coarse to medium sand.
		C		Reddish brown sand with some dark gray clay.
				Driller indicated that top of the clay layer was contacted at
				approximately 38' BLS.
40				

[illegible]



**WELL CONSTRUCTION SUMMARY**

Project: Dover AFB Owner: U.S. Air Force Well No.: W-024

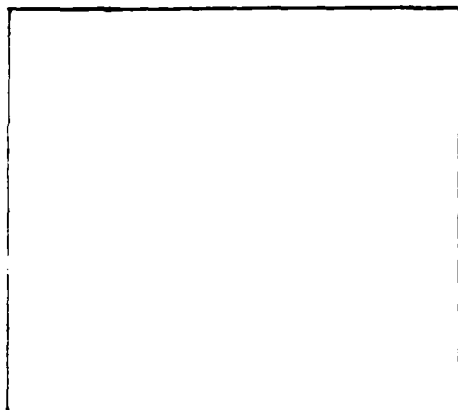
	<b>Drilling Summary:</b>			
	Total Depth: <u>33.5'</u>		Drillers: <u>Gary Truver</u>	
	Borehole Diameter's : <u>6"</u>		Walton Corporation	
	Rig Type: <u>CME Auger</u>			
	Elevation: Land Surface: <u>25.56'</u>		Bids : <u>Hollow Stem auger</u>	
	Top of Casing: <u>27.56'</u>		Drilling Fluid Type: <u>None</u>	
	Supervisory Geologist: <u>Richard Eades</u>		Amount Use: <u></u>	
	Log Book No. <u>5</u> pp. <u>61-67</u>		Water Level: <u>18'</u> 11/14/84	
	<b>Well Design:</b>			
	Casing: Material: <u>Schedule 40 PVC</u>		Screen: Material: <u>Schedule 40 PVC</u>	
	Diameter: <u>2"</u> ID <u>2 3/8"OD</u>		Diameter: <u>2"</u>	
	Length: <u>10'</u>		Slot: <u>0.010; 5 slots/inch</u>	
	Filter: Material: <u>None</u>		Setting: <u>18-33.5'</u>	
	Setting: <u></u>		Seals: Type: <u>Bentonite</u>	
	Grout: Type: <u>#1 Portland Cement/Ben</u>		Setting: <u>9.5'-11.5'</u>	
	Setting: <u>LS-9.5'</u>		Surface Casing: <u>Steel/PVC</u>	
	Other: <u>Formation caved into 11.5' providing natural sand pack from</u> <u>11.5' - 33.5'. Protective steel casing cemented into</u> <u>land surface.</u>			
	<b>Time Log:</b>			
		<b>Started</b>		<b>Completed</b>
	Drilling:	<u>11/14/84</u>	<u>0900 hrs</u>	<u>11/14/84 1030 hrs</u>
	Installation:	<u>11/14/84</u>	<u>1030 hrs</u>	<u>11/14/84 1139 hrs</u>
	Water Level Reading:	<u></u>	<u></u>	<u>11/14/84 1030 hrs</u>
	Development:	<u></u>	<u></u>	<u></u>
	<b>Well Development:</b>			
	Method/Equipment: <u>Air Blower for 5 hours, failed</u> <u>because of low recovery.</u>			

**DRILLING LOG**

Project: Dover AFB

Owner: U.S. Air Force

Well No.: MS-021



Site Sketch

Location: Industrial Field Book No.: 5 pp 61-62

Waste Basins

Log By: Rick Eades

Site T-1

Driller: Gary Truver

Rig Type: CME Auger

Reference

Total

Point: Land Surface

Depth: 33.5'

Reference

Date Time

Point

Elevation: \_\_\_\_\_

Drilling Started: 11/14/84 0900

Drilling Completed: 11/14/84 1000

Water Level: 18' 11/14/84 1000

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	Legend	DESCRIPTION	Gradation
				SI: Sampling Interval RE: Recovery SS: Split Spoon C: Cuttings		Trace 1-12% Little 12-20% Some 20-30% Add "y" 30%
0						
		C			Medium to light brown, silt, some clay, trace sand, trace pebbles.	
		SS#1		SI: 4-6' BLS		RE: 1.5'
			4		0.7' - Brown (10YR 5/6) clay, some silt.	
5			3		0.4' - Yellowish brown (10YR 6/6) sand, some silt, trace clay.	
			3		0.4' - Yellowish brown (10YR 6/8) clay, trace silt.	
			4			
		C			Silt, some clay, some sand.	
		SS#2		SI: 9-11' BLS		RE: 2.0'
			5		0.6' - Yellowish brown (10YR 6/8) clay, some silt.	
10			10		1.4' - Clay, trace silt grading downward in color from	

DRILLING LOG

10-02] cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
10		SS#2	12	light gray (5YR 7/1) to brown (10YR 5/6).
			15	
		C		Clay, trace silt, brown to grayish brown.
		SS#3		SI: 14-16' BLS RE: 2.0'
			3	0.2' - Brown (10YR 5/6) sand, some clay.
15			6	1.8' - Clay, color variable from gray (5YR 7/1) to
			9	yellowish brown (10YR 6/8) with black streaks.
			11	
		C		Hit gravel layer, approximately 0.5' thick.
		C		Sand, some clay, wet.
		SS#4		SI: 19-21' BLS RE: 2.0'
			1	2.0' - Light yellowish brown (10YR 7/8) fine sand,
20			1	some silt, trace clay, wet.
			2	
			3	
		C		Gravel, approximately 0.5' thick.
		C		Gravel, approximately 0.5' thick.
		SS#5		SI: 24-26' BLS RE: 1.5'
			5	1.5' - Medium to dark yellowish brown (10YR 5/8)
25			6	coarse to medium sand, some pebbles, trace

DRILLING LOG

MW-02j cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
25		SS#5	5	fine sand.
			7	
		SS#6		SI: 29-31' BLS RE: 1.3'
			6	1.3' - Dark yellowish brown (7.5YR 5/8) coarse to
30			6	medium sand, trace fine sand, trace pebbles.
			7	
			11	
				Driller indicated top of clay layer contacted at 33' BLS.
		SS#7		SI: 34-36' BLS RE: 2.0'
			3	2.0' - Medium to dark gray (5Y 4/1) clay,
			3	silty, dense, finely laminated.
35			4	
			4	
		SS#8		SI: 37.5-38.5' BLS RE: 1.0'
			2	1.0' - Dark gray (5Y 4/1) silty clay.
			3	
40				

# JRB ASSOCIATES

A Company of Science Applications, Inc.  
8400 Westpark Drive, McLean, Virginia 22102

## WELL CONSTRUCTION SUMMARY

Project: Dover AFB

Owner: U.S. Air Force

Well No.: MW-04

### Drilling Summary:

Total Depth: 44.8' BLS Drillers: Calvin Wallace  
Borehole Diameter(s): 6 1/2" Delmarva Drilling  
Rig Type: Failing 1250 Hydraulic Rotary  
Elevation: Land Surface: 23.2' Bit(s): Drag  
Top of Casing: 25.4' Drilling Fluid Type: Water/Bentonite  
Supervisory Geologist: Andris Lapins Amount Use:   
Log Book No. 3 pp. 16-28 Water Level: 12.76' BLS 1/9/85

### Well Design:

Casing: Material: PVC Screen: Material: PVC  
Diameter: 2" ID 2 1/4" OD Diameter: 2"  
Length: 13' Slot: 0.010; 5/inch  
Filter: Material: 4Q sand Setting: 10.8 - 44.8' BLS  
Setting: 8.8-44.8' BLS Seals: Type: Bentonite Pellets  
Grout: Type: #1 Portland Cement/Ben Setting: 5.25-8.8' BLS  
Setting: 3-5.25' BLS Surface Casing: Steel/PVC  
Other: Protective steel casing cemented in to land surface.

### Time Log:

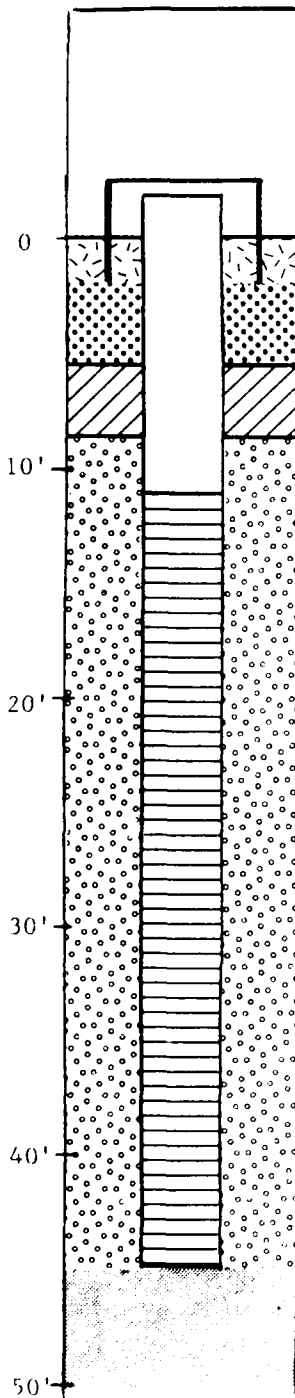
#### Started

#### Completed

Drilling:	11/9/84	0845 hrs.	11/9/84	1250 hrs.
Installation:	11/9/84	1300 hrs.	11/9/84	1442 hrs.
Water Level Reading:			1/9/85	12.76' BLS
Development:				

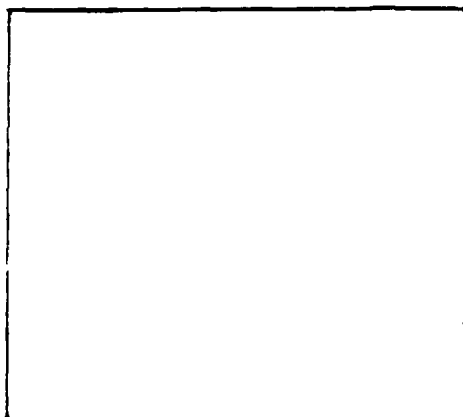
### Well Development:

Method/Equipment: Air lift for 5 min., removed at  
10 min. for 10 min., removed at  
until clear.



**DRILLING LOG**

**Project:** Dover AFB **Owner:** U.S. Air Force **Well No.:** MW-44



Site Sketch

**Location:** IW Basins, Site T-1 **Field Book No.:** 3 pp. 16-20  
**Log By:** Andris Lapins  
**Driller:** Calvin Wallace (Dele)  
**Rig Type:** Failing 1250 Hydraulic Rotary

**Reference Point:** Land Surface **Total Depth:** 44.8' BLS

**Reference Point Elevation:** 23.2' **Date** 11/9/84 **Time** 0845

**Drilling Started:** 11/9/84 12:00

**Drilling Completed:** 11/9/84 12:00

**Water Level:** 12.76' BLS 1/9/84

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	Legend	DESCRIPTION	Gradation
				SI: Sampling Interval RE: Recovery SS: Split Spoon C: Cuttings		Trace 1-12% Little 12-20% Some 20-30% Add "Y" >30%
0						
		C			Heavy gravel (crushed stone) from large crushed stone pile located @ 15' away.	
		C			Grayish brown medium sand, some silt and gravel.	
5		SS#1		SI: 5-7' BLS	RE: 1.1'	
			12		1.1' - Light gray to white (5Y 8/2 - 7/2) clayey very fine	
			21		sand, some silt; dense; firm, dry; brown to yellow	
			22		mottling at top.	
			35			
10						

**DRILLING LOG**

MW - 043 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
10		SS#2	14	SI: 10-12' BLS RE: 1.5'
			11	0.4' - Brownish yellow (10YR 6/6) coarse sand, some silt,
			14	trace light gravel; poorly sorted; moist.
			20	1.1' - White (5Y 8/2) silty very fine sand, trace clay and
				light gravel; loose; wet.
15		SS#3		SI: 15-17' BLS RE: 1.15'
			13	0.75' - White (2.5Y 8/2) medium to coarse sand, trace clay
			15	and light gravel; poorly sorted; firm; wet.
			40	0.4' - Yellow (2.5Y 8/6) fine to coarse sand, some silt,
			44	trace clay and light gravel; wet.
20		SS#4		SI: 20-22' BLS RE: 1.1'
			5	1.1' - Brownish yellow (10YR 6/8) fine to medium sand,
			7	some silt, trace clay and light gravel; light gravel
			8	laminations every several inches; loose; wet.
			10	
25				

**DRILLING LOG**

NW - 94 cont.

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	DESCRIPTION
25		SS#5	13	SI: 25-27' BLS RE: 0.8'
			43	0.35' - Pale yellow (2.5Y 8/4) fine to medium sand some
			18	silt, trace light gravel; poorly sorted; loose; wet.
			43	0.45' - Strong brown (7.5YR 5/8) fine to medium sand, some
				silt, trace light gravel; few rounded quartz pebbles
				at bottom; poorly sorted; wet.
30		SS#6		SI: 30-32 BLS' RE: None
		11	12	Two attempts for sample yielded no recovery. Much
		12	22	heavy gravel accumulated in bottom of bore hole. Drilling
		14	23	mud thickened and hole flushed to bring up gravel.
		20	25	
35		SS#7		SI: 35-37' BLS RE: 0.7'
			21	0.7' - Strong brown (7.5YR 5/8) fine sand, some silt; wet.
			18	
			21	
			26	
40				



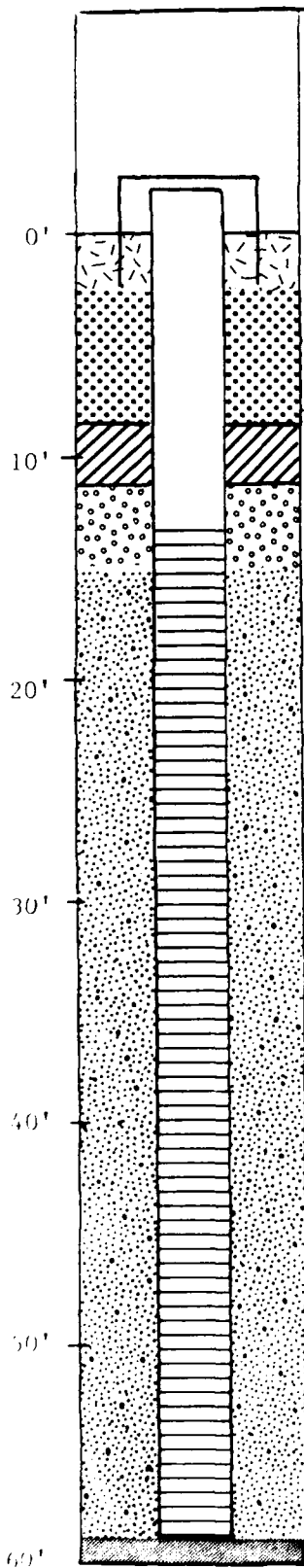
Page 1 of 1

## WELL CONSTRUCTION SUMMARY

Project: Dover AFB

Owner: U.S. Air Force

Well No.: 10W-100



### Drilling Summary:

Total Depth: 58.5' Drillers: Gary Truver  
Borehole Diameter(s): 6" Walton Corporation  
Rig Type: CME Auger  
Elevation: Land Surface: 17.97' Bit(s): Hollow stem auger  
Top of Casing: 20.07' Drilling Fluid Type: None  
Supervisory Geologist: Richard Eades Amount Use:   
Log Book No. 5 pp. 52-61 Water Level: 13' 11/13/84

### Well Design:

Casing: Material: Schedule 40 PVC Screen: Material: Schedule 40 PVC  
Diameter: 2" ID 2 3/8" OD Diameter: 2"  
Length: 15' Slot: 0.010; 5 slots/inch  
Filter: Material: 4Q Sand Setting: 13-58.5'  
Setting: 11-14' Seals: Type: Bentonite  
Grout: Type: #1 Portland Cement/Ben Setting: 9-11'  
Setting: LS-9.0' Surface Casing: Steel/PVC  
Other: Formation allowed to cave, providing natural sand pack from  
14.0' - 58.5'. Protective steel casing cemented into  
land surface.

### Time Log:

#### Started

#### Completed

	Started	Completed
Drilling:	11/13/84 0900 hrs	11/13/84 1230 hrs
Installation:	11/13/84 1332 hrs	11/13/84 1522 hrs
Water Level Reading:		11/13/84 1000 hrs
Development:		

### Well Development:

Method/Equipment: Air blown for 8 hours; pumped at 40 gpm for  
minimum 2 hours; and until clear

## DRILLING LOG

Project:      Dover AFB

Owner: \_\_\_\_\_

Well No.:

**Figure 1.**

Legend:  $\square$  Misperse

FIELD BUREAU FILE # 52-61

$$A_1 \cup A_2 = \{1, 2, 3, 4\}$$

by: Rick Eades

Triller: Gary Traver

ECL TYPE: CME Auger

### Reference

2000

**Abstract:** The purpose of this study was to determine the effect of a 12-week training program on the heart rate (HR) and heart rate reserve (HRR) of sedentary middle-aged men. The subjects were divided into two groups: a control group and an exercise group. The exercise group performed a 12-week training program consisting of three sessions per week, each lasting 30 minutes. The control group did not exercise. The HR and HRR were measured at rest and during exercise at the beginning and end of the 12-week period. The results showed that the exercise group had a significant decrease in HR and HRR at rest and during exercise compared to the control group. The control group had no significant change in HR and HRR. The results suggest that a 12-week training program can improve the cardiovascular fitness of sedentary middle-aged men.

Depth: 58.5'

## Reference

Date	Time
------	------

Peters

ELEVATION:

Drilling Started: 11/13/84 0900hr

Examine completed: 11/13/84 1230

Water Level: 13' 11/13/84 1000

1998

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	Description	Location T-100 1-12-20 Latitude 11-20 Sample No- 501 Date 09/09/2017
		C		Medium to dark brown silt, some clay	
		SS#1		SI: 4-6' BLS RE: 1.3'	
		2		1.3' - Light brown (10YR 6/4) fine to medium sand,	
		2		trace silt.	
		3			
		3			
		C		Pale brown sand, trace pebbles	
		C		Bit gravel layer, approximately 0.5' thick	
		SS#2		SI: 9-11' BLS RE: 1.3'	
		3		0.6' - Pale brown (10YR 6/4) fine to medium sand,	
		3		0.7' - White (N 8.5) sand and medium to small pebbles.	

DRILLING LOG

10-000000-000000

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
10		SS#2	6	
			5	
		C		Light brown to grayish brown coarse sand and cobbles.
		SS#3		SI: 14-16' BLS RE: 1.3'
			3	1.3' - Light grayish brown (2.5Y 7/2) fine to coarse
15			4	sand, some pebbles, trace silt, moist.
			3	
			2	
		C		Light to medium brown, coarse to medium sand, some
				pebbles, trace silt.
		SS#4		SI: 19-21' BLS RE: 0.7'
			4	0.7' - Light grayish brown (2.5Y 7/2) coarse sand
20			3	and cobbles, moist.
			2	
			3	
		C		Brown fine to coarse sand, some pebbles, trace silt, wet.
		SS#5		SI: 24-26' BLS RE: 1.7'
			5	0.3' - Light grayish brown (2.5Y 7/2) coarse to
25			5	medium sand, some pebbles.

DRILLING LOG

cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
25		SS#5	10	0.7' - Reddish brown (5YR 3/4) fine to medium sand,
			4	some silt, trace clay, trace pebbles.
				0.7' - Yellowish brown (10YR 6/8) fine to medium sand,
				some cobbles.
		C		Coarse to medium sand, some silt, some pebbles.
		SS#6		SI: 29-31' BLS RE: 1.3'
			12	0.2' - Dark Brown (7.5YR 5/8) sand, some pebbles.
30			6	0.2' - Dark Brown (7.5YR 3/4) sand, trace silt.
			3	0.5' - Yellowish brown (10YR 6/6) sand, some pebbles.
			10	0.4' - Dark brown (7.5YR 5/8) sand, trace silt.
		C		Medium to dark brown, coarse to medium sand, some pebbles.
		SS#7		SI: 34-36' BLS RE: 0.8'
			8	0.8' - Yellowish brown (10YR 6/6) fine to medium sand,
35			5	some silt, trace clay, trace pebbles.
			6	
			6	
		SS#8		SI: 39-41' BLS RE: 1.1'
			6	1.1' - Yellowish brown (10YR 5/6) fine sand, some silt,
40			4	trace clay.

DRILLING LOG

11-053 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
40		SS#8	5	
			11	
		SS#9		SI: 44-46' BLS RE: 1.7'
			2	1.7' - Light (10YR 5/6) to medium yellowish brown
45			2	(10YR 6/8) fine sand, some silt, some clay.
			3	
			6	
		SS#10		SI: 49-51' BLS R: 1.0'
			5	1.0' - Dark yellowish brown (7.5YR 4/6) fine to
50			5	medium sand, some silt.
			9	
			11	
		C		Light to medium brown, fine to coarse sand.
		SS#11		SI: 54-56' BLS RE: 1.5'
			8	1.5' - Dark yellowish brown (10YR 5/6) fine to coarse
55			8	sand, trace silt.

[illegible]

# JRB ASSOCIATES

A Company of Science Applications, Inc.

3400 Westpark Drive, McLean, Virginia 22102

## WELL CONSTRUCTION SUMMARY

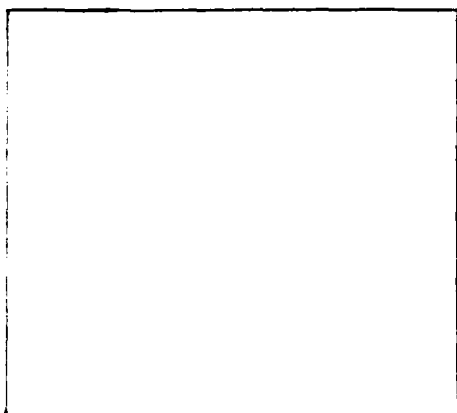
Project: Dover AFB Owner: U.S. Air Force Well No.: SM-061

	<b>Drilling Summary:</b>			
	Total Depth: <u>53'</u>	Drillers: <u>Calvin Wallace</u>		
	Borehole Diameter(s): <u>8"</u>	<u>Delmarva Drilling</u>		
	Rig Type: <u>Failing 1250 Hydraulic Rotary</u>			
	Elevation: Land Surface: <u>15.35'</u>	Bit(s): <u>Drag</u>		
	Top of Casing: <u>17.40'</u>	Drilling Fluid Type: <u>Water</u>		
	Supervisory Geologist: <u>Richard Eades</u>	Amount Use: <u></u>		
	Log Book No. <u>4</u> pp. <u>115-120</u>	Water Level: <u>13.1'</u> <u>11/14/84</u>		
<b>Well Design:</b>				
	Casing: Material: <u>PVC</u>	Screen: Material: <u>PVC</u>		
	Diameter: <u>2"</u> ID <u>2 3/8"</u> OD	Diameter: <u>2"</u>		
	Length: <u>10'</u>	Slot: <u>0.010; 5/16 inch</u>		
	Filter: Material: <u>40 Sand</u>	Setting: <u>8'-53'</u>		
	Setting: <u>6'-53'</u>	Seals: Type: <u>Bentonite</u>		
	Grout: Type: <u>#1 Portland Cement/Ben</u>	Setting: <u>4'-6'</u>		
	Setting: <u>LS-4.0'</u>	Surface Casing: <u>Steel/PVC</u>		
	Other: <u>Protective steel casing cemented in to land surface.</u>			
<b>Time Log:</b>				
	Started		Completed	
	Drilling:	<u>11/2/84</u> <u>0710 hrs</u>	<u>11/2/84</u> <u>0940 hrs</u>	
	Installation:	<u>11/2/84</u> <u>1020 hrs</u>	<u>11/2/84</u> <u>1155 hrs</u>	
	Water Level Reading:		<u>11/14/84</u> <u>1550 hrs</u>	
	Development:			
<b>Well Development:</b>				
	Method/Equipment: <u>Air blown for 8 hours, pumped at 10 gpm for minimum 2 hours and until clear.</u>			



**DRILLING LOG**

Project: Dover AFB Owner: U.S. Air Force Well No.: MW-061



Site Sketch

Location: Disposal Area Field Book No.: 4 pp115-120

#10 Log By: Rick Eades

Driller: Calvin Wallace

Rig Type: Failing 1250 Hydraulic Rotary

Reference Point: Land Surface Total Depth: 53'

Reference Point Elevation: \_\_\_\_\_ Date Time

Drilling Started: 11/2/84 0710hrs

Drilling Completed: 11/2/84 0940

Water Level: 13.1' 11/14/84 1550

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	Legend	DESCRIPTION	Gradation
				SI: Sampling Interval RE: Recovery SS: Split Spoon C: Cuttings		Trace 1-12 Little 12-20 Some 20-30 Add "Y" 30
0						
		C			Medium brown, clay, some silt.	
		SS#1			SI: 5-7' BLS RE: 1.5'	
			3		1.5' - Interbedded yellow brown (10YR 6/8) silt	
			6		and gray (5YR 7/1) clay	
			8			
			10			
		C			Light brown gravel, some sand.	

DRILLING LOG

MW-06j

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
10		SS#2	11	SI: 10-12' BLS RE: 0.5'
			10	0.5' - Light gray (5YR 7/1) to white, coarse sand,
			8	cobbly, trace fine sand.
			15	
		C		Light yellow brown, coarse to medium sand, some fine sand, trace silt.
15		SS#3		SI: 15-17' BLS RE: 0.2'
			7	0.2' - Tan to grayish brown (2.5Y 6/2) coarse sand,
			5	some fine sand, trace silt.
			6	
			11	
		C		Light grayish brown, coarse to fine sand, some pebbles.
20		SS#4		SI: 20-22' BLS RE: 0.6'
			5	0.6' - Light grayish brown (2.5Y 6/2) coarse to fine
			6	sand, some silt.
			8	
			13	
		C		Yellowish brown, coarse sand, some pebbles, some fine sand.
25				

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
25		SS#5	6	SI: 25-27' BLS RE: 2.0'
			8	2.0' - Yellowish red (5YR 6/8) medium sand, some fine
			6	sand, trace silt, trace pebbles.
			12	
		C		Yellow brown coarse sand, some cobbles, trace silt.
30		SS#6		SI: 30-32' BLS RE: 0.2'
			11	0.2' - Brownish yellow (10YR 6/8) medium to fine
			9	sand, trace silt.
			13	
			20	
		C		Yellow brown coarse sand, some pebbles.
35		SS#7		SI: 35-37' BLS RE: 0.7'
			16	0.7' - Brownish yellow (10YR 6/8) medium to coarse
			14	sand, some fine sand.
			11	
			15	
		C		Yellow brown, coarse to medium sand.
40				

DRILLING LOG

MW-06j cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
40		SS#8	17	SI: 40-42' BLS RE: 0.7'
			23	0.7' - Yellowish brown (10YR 6/8) very coarse sand
			21	and cobbles, up to 1.0" in diameter, some
			36	fine sand.
		C		Yellowish brown, medium sand, some pebbles.
45		SS#9		SI: 45-47' BLS RE: 0.7'
			18	0.7' - Dark reddish brown (10YR 5/6) coarse sand,
			20	some pebbles.
			24	
			29	
		C		Yellowish, red brown, coarse sand, some pebbles.
50		SS#10		SI: 50-52' BLS RE: 0.7'
			25	0.7' - Yellowish brown (10YR 6/8) cobbles, some
			33	coarse sand.
			36	
			39	
				Driller identified top of layer at approximately 53' BLS.
		C		Coarse sand with trace dark gray clay.
55				

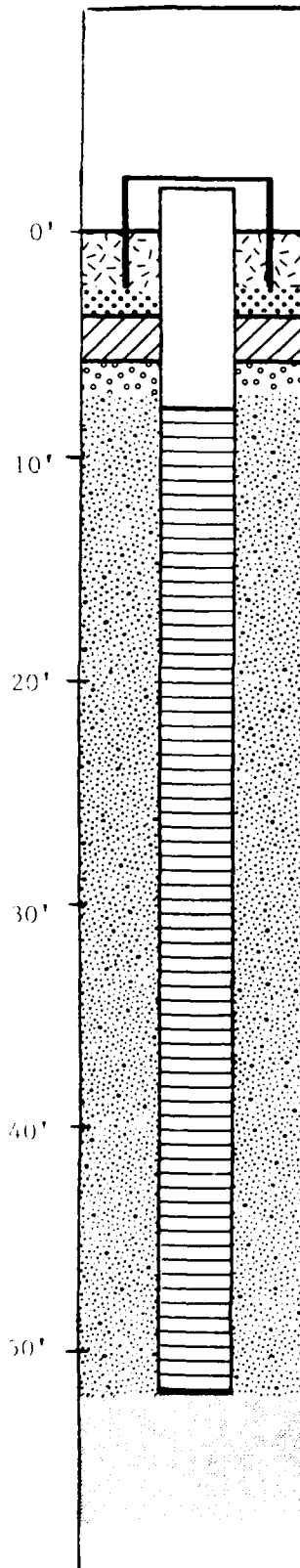
## DRILLING LOG

MW-06) cont.

[illegible]

## WELL CONSTRUCTION SUMMARY

Project: Dover AFB Owner: U.S. Air Force Well No.: 107

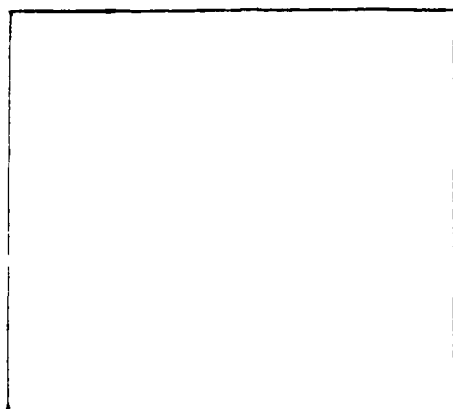
	<b>Drilling Summary:</b>			
	Total Depth: <u>52' BLS</u>		Drillers: <u>Gary Truver</u>	
	Borehole Diameter(s): <u>6"</u>		Walton Drilling	
	Rig Type: <u>CME-55/Auger</u>			
	Elevation: Land Surface: <u>10.37'</u>		Bit(s): <u>Auger</u>	
	Top of Casing: <u>12.57'</u>		Drilling Fluid Type: <u>Water</u>	
	Supervisory Geologist: <u>Andris Lapins</u>		Amount Use: <u></u>	
	Log Book No. <u>2</u> pp. <u>6-19</u>		Water Level: <u>6.5' BLS 11/8/84</u>	
	<b>Well Design:</b>			
	Casing: Material: <u>PVC</u>		Screen: Material: <u>PVC</u>	
	Diameter: <u>2"</u> ID <u>2 1/4"</u> OD		Diameter: <u>2"</u>	
	Length: <u>10'</u>		Slot: <u>0.010; 5/16"</u>	
	Filter: Material: <u>Formation/4Q Sand</u>		Setting: <u>8'-52' BLS</u>	
	Setting: <u>7.3'-52' BLS/5.8'-7.3' BLS</u>		Seals: Type: <u> Bentonite Pellets</u>	
	Grout: Type: <u>#1 Portland Cement/Ben</u>		Setting: <u>3.8' - 5.8' BLS</u>	
	Setting: <u>2.5' - 3.8' BLS</u>		Surface Casing: <u>Steel/PVC</u>	
	Other: <u>Protective steel casing cemented in to land surface.</u>			
	<b>Time Log:</b>			
		<b>Started</b>		<b>Completed</b>
	Drilling:	<u>11/31/84</u>	<u>1440 hrs.</u>	<u>11/1/84 0945 hrs.</u>
	Installation:	<u>11/01/84</u>	<u>1038 hrs.</u>	<u>11/1/84 1300 hrs.</u>
	Water Level Reading:	<u>7' BLS</u>	<u>11/1/84</u>	<u>6.5' BLS 11/8/84</u>
	Development:			
	<b>Well Development:</b>			
	Method/Equipment: <u>Air blown for 8 hours; pumped at 10 gpm for</u>			
	<u>minimum 2 hours and until clear.</u>			

**DRILLING LOG**

Project: Dover AFB

Owner: U.S. Air Force

Well No.: 10-171



Site Sketch

Location: Disposal Site Field Book No.: 2 pp 6-19

2-10

Log By: Andris Lapins

Driller: Gary Truver (Walton)

Rig Type: CME-55 : Auger

Reference

Point: Land Surface

Total

Depth: 52' BLS

Reference

Point

Elevation: 10.37'

Date Time

Drilling Started: 10/31/84 1440

Drilling Completed: 11/1/84 1300

Water Level: 6.5' BLS 11/8/84 0859

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	Legend	DESCRIPTION	Gradation
				SI: Sampling Interval RE: Recovery SS: Split Spoon C: Cuttings		Trace 1-12% Little 12-20% Some 20-30% Add "Y" 30%
0						
		C			Heavy gravel layer at 2-3' BLS; large subangular quartz pebbles 0.1-0.2' in diameter.	
		SS#1		SI: 4-6' BLS	RE: 0.8'	
			5		0.8' - Dark grayish brown (2.5Y 4/2) silty sand, some gravel	
			5		and clay; poorly sorted; dry to moist; large rounded	
5			5		quartz pebbles.	
			5			
		C			Dark gray (2.5Y 4/0) fine to coarse silty sand, some gravel	
					and clay; poorly sorted, moist to wet. Strong hydrocarbon odor	
					in cuttings from 1-6' BLS. Sediments submerged in water	
					have sheen on water surface.	
		SS#2		SI: 9-11' BLS	RE: 1.9'	
			1		1.8' - Gray (5Y 5/1) fine sand, some silt, trace clay;	
10			1		loose to medium dense; saturated;	

Page 2 of 5



Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
25		SS#5	3	
			4	
		C		Gray silty clayey sand.
		SS#6		SI: 29-31' BLS RE: 1.4'
			3	0.65' - Same as 24-26' BLS
30			4	0.75' - Brownish yellow (10YR 6/8) coarse sand and gravel,
			5	trace silt; loose; wet.
			5	
				Sands heaved in auger @ 34' ; no sample taken at 34' BLS.
35				
		SS#7		SI: 39-41' BLS RE: 0.9'
			7	0.9' - Strong brown (7.5YR 5/8) fine sand, little silt;
40			8	well sorted; wet.

**DRILLING LOG**

MW-07j cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
40		SS#7	11	
			13	
		SS#8		SI: 44-46' BLS RE: 0.8'
			8	0.8' - Same as above
			8	
45			12	
			14	
		SS#9		SI: 49-51' BLS RE: 0.9'
			8	0.9' - Strong brown fine sand, some silt, trace gravel; wet.
			11	
50			17	
			27	
				Driller reports entering top of clay layer at @ 52' BLS.
		SS#10		SI: 54-56' BLS RE: 1.9'
			2	1.9' - Very dark gray (5Y 3/1) silty clay; trace very fine
55			4	sand with light to dark gray (2.5Y 4/0) very fine

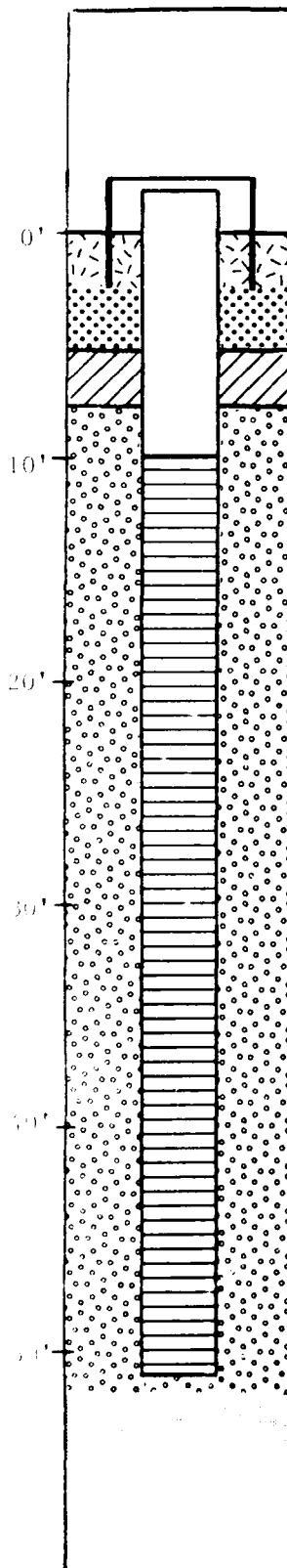
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# JRB ASSOCIATES

A Company of Science Applications, Inc.  
8400 Westpark Drive, McLean, Virginia 22102

## WELL CONSTRUCTION SUMMARY

Project: Dover AFB Owner: U.S. Air Force Well No.: MW-081



### Drilling Summary:

Total Depth: 51' BLS Drillers: Calvin Wallace  
Borehole Diameter(s): 6 1/2" Delmarva Drilling  
Failing 1250 Hydraulic  
Rig Type: Rotary  
Elevation: Land Surface: 12.5' Bit(s): Drag  
Top of Casing: 14.2' Drilling Fluid Type: Water/Bentonite  
Supervisory Geologist: Andris Lapins Amount Use:   
Log Book No. 3 pp. 1-16 Water Level: 8.9' BLS 1/9/85

### Well Design:

Casing: Material: PVC Screen: Material: PVC  
Diameter: 2" ID 2 1/4" OD Diameter: 2"  
Length: 12' Slot: 0.010; 5/16 inch  
Filter: Material: 4Q Sand Setting: 10-51' BLS  
Setting: 7.9-51' BLS Seals: Type: Bentonite Pellets  
Grout: Type: #1 Portland Cement/Ben Setting: 5.1-7.9' BLS  
Setting: 2.3-5.1' BLS Surface Casing: Steel/PVC  
Other: Protective steel casing cemented in to land surface.

### Time Log:

#### Started

#### Completed

Drilling:	11/7/84	1310 hrs	11/8/84	1546 hrs
Installation:	11/8/84	1600 hrs	11/8/84	1711 hrs
Water Level Reading:			1/9/85	8.9' BLS
Development:				

### Well Development:

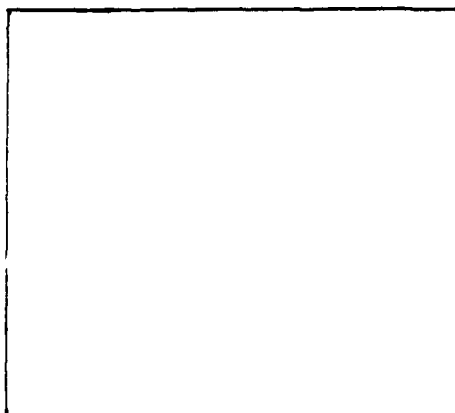
Method/Equipment: Air blown for 8 hours; pumped at 10 gpm for  
minimum 2 hours and until clear.

**DRILLING LOG**

Project: Dover AFB

Owner: U.S. Air Force

Well No.: MW-08j



Site Sketch

Location: Disposal Site Field Book No.: 3 pp 1-14  
D-10 Log By: Andris Lapins  
Driller: Calvin Wallace (Delmarva)  
Rig Type: Failing 1250 Hydraulic Rotary

Reference Total  
Point: Land Surface Depth: 51' BLS

Reference  
Point Date Time

Elevation: 12.5' Drilling Started: 11/7/84 1310 hrs

Drilling Completed: 11/8/84 1546

Water Level: 8.9' BLS 1/9/85

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	Legend	DESCRIPTION	Gradation
				SI: Sampling Interval RE: Recovery SS: Split Spoon C: Cuttings		Trace 1-12% Little 12-20% Some 20-30% Add "Y" >30%
0						
		C			Rig shimmied at 3-4 BLS. Heavy gravel layer; rounded pebbles in cuttings.	
		SS#1			SI: 5-7' BLS RE: 1.1'	
5			20		0.6' - Yellow fine to medium sand, trace silt, clay and	
			51		gravel; moist.	
			99		0.4' - White very fine sand, some gravel, trace silt;	
			75		firm; dry.	
					0.1' - Light olive gray fine to coarse sand, some silt and	
					gravel, trace clay; poorly sorted; firm; dry.	
10						

**DRILLING LOG**

MW-08j cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
10		SS#2	8	SI: 10-12' BLS RE: 0.4'
			7	0.4' - Light to dark gray fine sand, some silt, trace
			7	gravel; wet; emits distinct hydrocarbon odor.
			10	
15		SS#3		SI: 15-17' BLS RE: 1.0'
			8	0.7' - Pale yellow fine sand, trace silt and gravel; wet.
			10	0.3' - Yellow fine sand, trace silt; wet.
			7	
			9	
20		SS#4		SI: 20-22' BLS RE: 1.2'
			9	0.85' - Brown silty very fine sand; wet.
			9	0.35' - Yellow very fine sand, some silt; medium dense; wet.
			7	
			9	
25				

**DRILLING LOG**

MW-08] cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
25		SS#5	9	SI: 25-27' BLS RE: 0.7'
			11	0.7' - Reddish yellow very fine to fine sand, some
			11	silt, trace fine gravel; wet.
			13	
30		SS#6		SI: 30-32' BLS RE: 0.9'
			19	0.9' - Yellow to reddish yellow medium to coarse sand,
			18	little silt, some gravel; loose; wet.
			21	
			24	
35		SS#7		SI: 35-37' BLS RE: 1.1'
			26	0.8' - Medium to coarse sand, some silt, trace light gravel;
			14	loose; wet.
			18	0.3' - Yellow to pale yellow fine sand, some silt; wet.
			29	
40				

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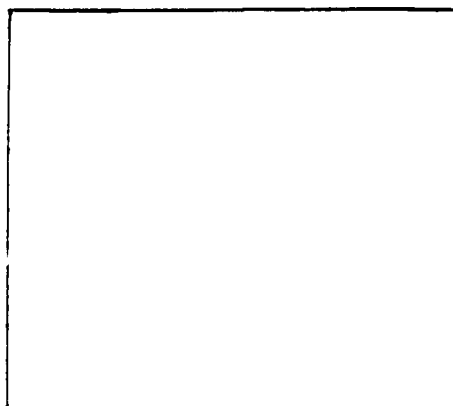
**WELL CONSTRUCTION SUMMARY**

Project: Dover AFB Owner: U.S. Air Force Well No.: MW-091

	<b>Drilling Summary:</b> Total Depth: <u>52' BLS</u> Drillers: <u>Gary Truver</u> Borehole Diameter(s): <u>6"</u> (Walton Drilling) Rig Type: <u>CME-55 : Auger</u> Elevation: Land Surface: <u>14.55'</u> Bit(s): <u>Auger</u> Top of Casing: <u>16.35'</u> Drilling Fluid Type: <u>Water</u> Supervisory Geologist: <u>Andris Lapins</u> Amount Use: _____ Log Book No. <u>2</u> pp. <u>19-30</u> Water Level: <u>10' BLS 11/1/84</u> <u>9.96' BLS 11/8/84</u>															
	<b>Well Design:</b> Casing: Material: <u>PVC</u> Screen: Material: <u>PVC</u> Diameter: <u>2"</u> ID <u>2 1/4"</u> OD Diameter: <u>2"</u> Length: <u>12'</u> Slot: <u>0.010; 5/16"</u> Filter: Material: <u>Formation/4Q Sand</u> Setting: <u>10'-52' BLS</u> Setting: <u>10.4-52'/8-10.4' BLS</u> Seals: Type: <u>Bentonite Pellets</u> Grout: Type: <u>#1 Portland Cement/Ben</u> Setting: <u>6-8' BLS</u> Setting: <u>2.4'-6' BLS</u> Surface Casing: <u>steel/PVC</u> Other: <u>Protective steel casing cemented in to land surface.</u>															
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Time Log:</th> <th style="text-align: left;">Started</th> <th style="text-align: left;">Completed</th> </tr> </thead> <tbody> <tr> <td>Drilling:</td> <td><u>11/1/84 1524 hrs</u></td> <td><u>11/2/84 0829 hrs</u></td> </tr> <tr> <td>Installation:</td> <td><u>11/2/84 0837 hrs</u></td> <td><u>11/2/84 1027 hrs</u></td> </tr> <tr> <td>Water Level Reading:</td> <td><u>10' BLS 11/1/84 1552</u></td> <td><u>9.96' BLS 11/8/84</u></td> </tr> <tr> <td>Development:</td> <td>_____</td> <td>_____</td> </tr> </tbody> </table>	Time Log:	Started	Completed	Drilling:	<u>11/1/84 1524 hrs</u>	<u>11/2/84 0829 hrs</u>	Installation:	<u>11/2/84 0837 hrs</u>	<u>11/2/84 1027 hrs</u>	Water Level Reading:	<u>10' BLS 11/1/84 1552</u>	<u>9.96' BLS 11/8/84</u>	Development:	_____	_____
	Time Log:	Started	Completed													
	Drilling:	<u>11/1/84 1524 hrs</u>	<u>11/2/84 0829 hrs</u>													
	Installation:	<u>11/2/84 0837 hrs</u>	<u>11/2/84 1027 hrs</u>													
	Water Level Reading:	<u>10' BLS 11/1/84 1552</u>	<u>9.96' BLS 11/8/84</u>													
	Development:	_____	_____													
	<b>Well Development:</b> Method/Equipment: <u>Air blown for 8 hours, turned for 1 hour</u> <u>1 hour and until clear.</u>															

**DRILLING LOG**

Project: Dover AFB Owner: U.S. Air Force Well No.: MW-09j



Site Sketch

Location: Disposal Site Field Book No.: 2 pp 19-30  
D-10 Log By: Andris Lapins  
Driller: Gary Truver (Walton)  
Rig Type: CME 55 : Auger  
Reference Point: Land Surface Total Depth: 52.2' BLS  
Reference Point Elevation: 14.55' Date Time  
Drilling Started: 11/1/84 1524hrs  
Drilling Completed: 11/2/84 1045hrs  
Water Level: 9.96' BLS 11/8/84 0925hrs

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	Legend	DESCRIPTION	Gradation
				SI: Sampling Interval RE: Recovery SS: Split Spoon C: Cuttings		Trace 1-12% Little 12-20% Some 20-30% Add "Y" >30%
0						
		C			Yellowish brown clay and silt. some sand. Rig shimmied at @ 2.5 BLS - heavy gravel layer; large (0.1-0.2' diameter) rounded pebbles; small piece of fibre glass (@ 1").	
		SS#1		SI: 4-6' BLS RE: 1.8'		
			4		1.4' - Light gray (5Y 7/2) clay, some silt, little sand and	
			8		gravel; firm; dense; moist.	
5			14		0.4' - Light gray to white (5Y 7/2-8/2) very fine sand; some	
			17		silt, trace gravel; dry to moist.	
					Heavy gravel layer at @ 7' BLS; rig shimmied	
		SS#2		SI: 9-11' BLS RE: 1.3'		
			6		1.3' - Pale yellow (5Y 7/3) fine to coarse sand and gravel,	
10			7		some silt, few large pebbles; poorly sorted; wet.	

**DRILLING LOG**

MW-09; cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
10		SS#2	7	Reworked "urban land".
			8	
				Static water level in auger - 10' BLS.
		SS#3		SI: 14-16' BLS RE: 1.8'
			1	1.8' - White (5Y 8/2) very fine sand, some silt, trace clay
15			1	and gravel; loose; saturated.
			1	
			2	
		SS#4		SI: 19-21' BLS RE: 1.1'
			3	1.1' - same as above
20			2	
			1	
			1	
		SS#5		SI: 24-26' BLS RE: 1.6'
			2	0.6' - same as above
			2	1.0' - Brownish yellow (10YR 6/8) fine to medium sand, some
25			2	silt, little gravel; loose; wet. 1" coarse sand and

**DRILLING LOG**

MW-09j cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
25		SS#5	3	gravel layer at top and bottom of sample.
		SS#6		SI: 29-31' BLS RE: 0.8'
			5	0.8' - Brownish yellow very fine to fine silty sand; large
30			2	iron concretion at top of sample; wet.
			3	
			4	
		SS#7		CI: 34-36' BLS RE: 1.8'
			2	1.8' - Strong brown (7.5YR 5/8) coarse sand and gravel,
35			3	some silt, few rounded quartz pebbles; loose;
			5	wet.
			5	
		SS#8		SI: 39-41' BLS RE: 0.3'
			12	0.3' - same as above
			11	
40			10	

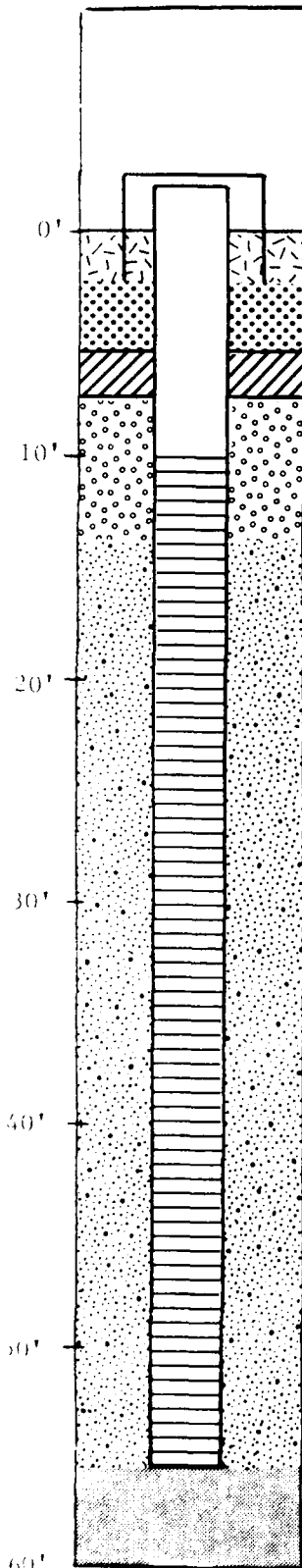
**DRILLING LOG**

MW-09j cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
40		SS#8	11	
				Static water level in auger - 12.1' BLS.
		SS#9		SI: 44-46' BLS RE: 0.6'
			5	0.6' - Strong brown (7.5YR 5/8) medium sand, some silt
45			6	and gravel; few rounded pebbles; wet.
			10	
			12	
		SS#10		SI: 49-51' BLS RE: 0.85'
			7	0.85' - Yellowish brown (10YR 5/8) fine sand, some silt,
50			8	trace clay; wet.
			10	
			12	
				Driller indicates entering clay layer at @ 52.5' BLS.
		SS#11		SI: 53-55' BLS RE: 1.4'
			2	0.2' - Brownish yellow (10YR 6/8) silty clay with light gray
			5	laminations throughout; soft; dense.
			1	1.2' - Very dark gray silty clay, trace very fine sand; light
55			7	gray very fine sand and silt laminations throughout;
				firm; dense.

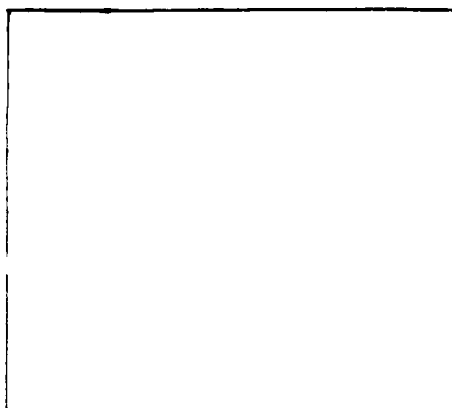
**WELL CONSTRUCTION SUMMARY**

Project: Dover AFB Owner: U.S. Air Force Well No.: MW-10

	<b>Drilling Summary:</b>	
	Total Depth: <u>56'</u>	Drillers: <u>Garv Truver</u>
	Borehole Diameter(s): <u>6"</u>	<u>Walton Corporation</u>
	Rig Type: <u>CNE Auger</u>	
Elevation: Land Surface: <u>19.40'</u>	Bit(s): <u>Hollow stem auger.</u>	
Top of Casing: <u>22.38'</u>	Drilling Fluid Type: <u>None</u>	
Supervisory Geologist: <u>Richard Eades</u> Amount Use: _____		
Log Book No. <u>4</u> pp. <u>50-65</u> Water Level: <u>11' BLS</u> <u>10/25/84</u>		
<b>Well Design:</b>		
Casing: Material: <u>Schedule 40 PVC</u> Screen: Material: <u>Schedule 40 PVC</u>		
Diameter: <u>2"</u> ID <u>2 3/8"</u> OD Diameter: <u>2"</u>		
Length: <u>12.0'</u> Slot: <u>0.010; 5 slots/inch</u>		
Filter: Material: <u>40 Sand</u> Setting: <u>10-56' BLS</u>		
Setting: <u>8-13' BLS</u> Seals: Type: <u>Bentonite</u>		
Grout: Type: <u>#1 Portland Cement/Ben</u> Setting: <u>6-8' BLS</u>		
Setting: <u>LS-6'</u> Surface Casing: <u>Steel/PVC</u>		
Other: <u>Formation allowed to cave, providing natural sand pack from</u>		
<u>13.0 - 56.0'. Protective steel casing cemented into</u>		
<u>land surface.</u>		
<b>Time Log:</b>		
	<b>Started</b>	<b>Completed</b>
Drilling:	<u>10/25/84 0839 hrs</u>	<u>10/25/84 1152 hrs</u>
Installation:	<u>10/25/84 1152 hrs</u>	<u>10/25/84 1510 hrs</u>
Water Level Reading:	<u>10/25/84</u>	<u>1155 hrs</u>
Development:	_____	_____
<b>Well Development:</b>		
Method/Equipment: <u>Air blown for 8 hours, pumped for</u>		
<u>2 hours and until clear</u>		
_____		
_____		

**DRILLING LOG**

**Project:** Dover AFB **Owner:** U.S. Air Force **Well No.:** MW- 10



Site Sketch

**Location:** Disposal **Field Book No.:** 4 pp 50-65

**Area #4** **Log By:** Rick Eades

**Driller:** Gary Truver

**Rig Type:** CME Auger

**Reference Point:** Land Surface **Total Depth:** 56'

**Reference Point Elevation:** 19.40' **Date** Time

**Drilling Started:** 10/25/84 0839hr

**Drilling Completed:** 10/25/84 1152

**Water Level:** 11' 10/25/84 1155

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	Legend	DESCRIPTION	Gradation
				SI: Sampling Interval RE: Recovery SS: Split Spoon C: Cuttings		Trace 1-12% Little 12-20% Some 20-30% Add "Y" 30%
0						
		C			Orange brown sand and gravel, with grayish brown sand.	
		SS#1		SI: 4-5.5' BLS RE: 1.4'		
			3		0.7' - Orange brown (7.5YR 5/8) sand, some silt, trace clay.	
5			2		0.7' - Dark grayish brown (5Y 4/1) clay, some silt with	
			2		thin reddish orange laminations.	
		C			Medium to light gray silt, some clay.	
		SS#2		SI: 9-10.5' BLS RE: 1.4'		
			3		1.4' - Dark gray (5Y 4/1) clay grading down to clay	
10			4		interbedded with thin reddish brown silt stringers.	

**DRILLING LOG**

MW- 10 cont.

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	DESCRIPTION
10		SS#2	4	
		C		Light gray sand, wet.
		SS#3		SI: 14-15.5' RE: 1.4'
			3	0.9' - Light gray (5YR 7/1) medium to coarse sand, some silt.
15			3	0.5' - Interbedded yellow brown (5YR 5/8) and brownish gray
			4	(5YR 6/3) sand, wet.
		C		Gray to grayish brown, medium to coarse sand, some silt.
		SS#4		SI: 19-20.5' BLS RE: 1.4'
			2	0.3' - Light gray (5YR 7/1) medium to coarse sand.
20			6	0.7' - Interbedded light gray (5YR 6/2) silt and reddish
			6	brown (5YR 6/8) clay.
				0.4' - Light gray (5YR 7/1) coarse sand.
		C		Tan, medium to coarse sand, some silt, some clay.
		SS#5		SI: 24-25.5' BLS RE: 0.9'
			3	0.2' - Grayish brown (7.5YR 7/2) medium sand.
25			6	0.3' - Interbedded red brown (5YR 6/8) clay and light



DRILLING LOG

MW- 10 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
25		SS#5	8	gray (5YR 7/1) silt.
				0.4' - Light gray (5YR 7/1) medium to coarse sand.
		C		Gravel layer, approximately 1.0' thick.
		SS#6		SI: 29-30.5' BLS RE: 0.5'
			5	0.5' - Light gray gravel (5YR 7/1) with orange brown
30			7	streaks (5YR 6/8) of coarse sand. Quartz cobbles
			9	up to 1.2" in diameter.
		SS#7		SI: 34-35.5' BLS RE: 0.5'
			5	0.3' - Brown (7.5YR 7/2) coarse sand, some gravel, some
			5	fine sand.
35			7	0.2' - Reddish brown (7.5YR 5/8) coarse sand, some fine sand.
		C		Brownish gray, coarse sand.
		SS#8		SI: 39-40.5' BLS RE: 0.3'
			4	0.3' - Light gray (5YR 7/1) medium to coarse sand, trace
40			5	silt, trace gravel. Disseminated very fine

**DRILLING LOG**

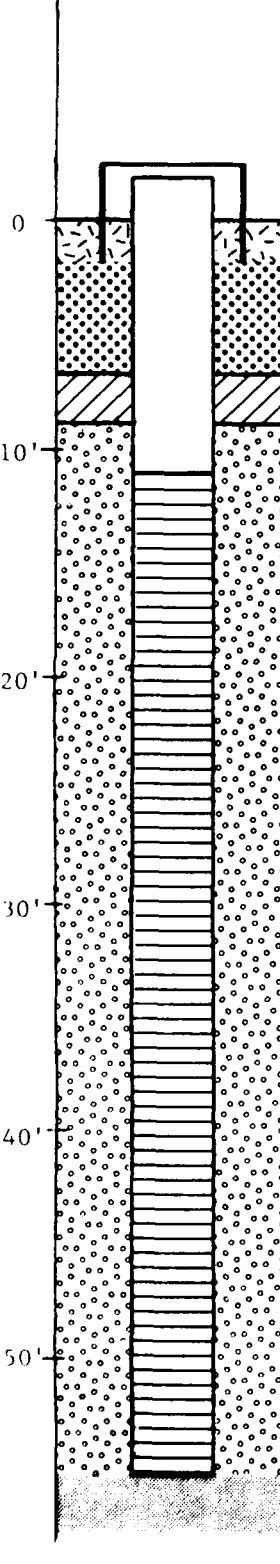
MW- 10 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
40		SS#8	9	black grains.
		C		Light brownish gray, fine sand.
		SS#9		SI: 44-45.5' BLS RE: 0.0'
			8	Attempted split spoon sample, no recovery, considered
45			10	interval to be composed of clean sand.
			12	
		C		Light brown to yellowish brown, fine sand, very wet.
		SS#10		SI: 49-50.5' BLS RE: 0.5'
			12	0.5' - Greenish brown (2.5Y 5/6) coarse to medium sand,
50			10	some pebbles, some fine sand, trace silt.
			9	
		SS#11		SI: 54-55.5' BLS RE: 0.0'
			28	Attempted split spoon sample, no recovery, considered
55			20	interval to be composed of clean sand.

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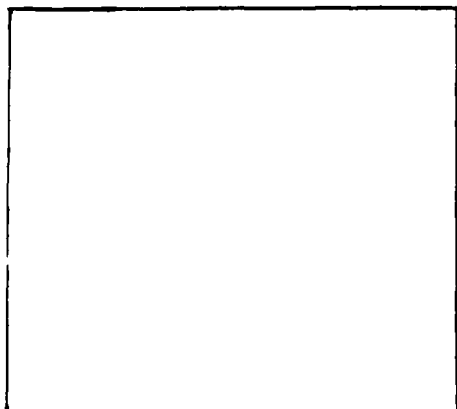
**WELL CONSTRUCTION SUMMARY**

Project: Dover AFB Owner: U.S. Air Force Well No.: MW- 11

	<b>Drilling Summary:</b>																
	Total Depth: <u>55' BLS</u> Drillers: <u>Calvin Wallace</u> Borehole Diameter(s): <u>6½"</u> Delmarva Drilling Rig Type: <u>Failing 1250 Hydraulic Rotary</u> Elevation: Land Surface: <u>19.75'</u> Bit(s): <u>Drag</u> Top of Casing: <u>21.76'</u> Drilling Fluid Type: <u>Water/Bentonite</u> Supervisory Geologist: <u>Andris Lapins</u> Amount Use: _____ Log Book No. <u>1</u> pp. <u>31-44</u> Water Level: <u>10.7' BLS 10/29/84</u>																
	<b>Well Design:</b>																
	Casing: Material: <u>PVC</u> Screen: Material: <u>PVC</u> Diameter: <u>2"</u> ID <u>2 1/4"OD</u> Diameter: <u>2"</u> Length: <u>13'</u> Slot: <u>0.010; 5/inch</u> Filter: Material: <u>4Q Sand</u> Setting: <u>11'-55' BLS</u> Setting: <u>8.8'-55' BLS</u> Seals: Type: <u>Bentonite</u> Grout: Type: <u>#1 Portland Cement/Ben</u> Setting: <u>6.5'-8.8' BLS</u> Setting: <u>3.5'-6.5' BLS</u> Surface Casing: <u>Steel/PVC</u> Other: <u>Protective steel casing cemented in to land surface.</u>																
<b>Time Log:</b>																	
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;"></th> <th style="width: 20%; text-align: center;">Started</th> <th style="width: 40%; text-align: center;">Completed</th> </tr> </thead> <tbody> <tr> <td>Drilling:</td> <td style="text-align: center;"><u>10/25/84    1200 hrs</u></td> <td style="text-align: center;"><u>10/26/84    1008 hrs</u></td> </tr> <tr> <td>Installation:</td> <td style="text-align: center;"><u>10/26/84    1021 hrs</u></td> <td style="text-align: center;"><u>10/26/84    1150 hrs</u></td> </tr> <tr> <td>Water Level Reading:</td> <td colspan="2" style="text-align: center;"><u>10.7' BLS    10/29/84</u></td> </tr> <tr> <td>Development :</td> <td colspan="2"></td> </tr> </tbody> </table>				Started	Completed	Drilling:	<u>10/25/84    1200 hrs</u>	<u>10/26/84    1008 hrs</u>	Installation:	<u>10/26/84    1021 hrs</u>	<u>10/26/84    1150 hrs</u>	Water Level Reading:	<u>10.7' BLS    10/29/84</u>		Development :		
	Started	Completed															
Drilling:	<u>10/25/84    1200 hrs</u>	<u>10/26/84    1008 hrs</u>															
Installation:	<u>10/26/84    1021 hrs</u>	<u>10/26/84    1150 hrs</u>															
Water Level Reading:	<u>10.7' BLS    10/29/84</u>																
Development :																	
<b>Well Development:</b>																	
Method/Equipment: <u>Air blown for 8 hours, pumped for minimum</u> <u>2 hours and until clear.</u>																	

**DRILLING LOG**

**Project:** Dover AFB **Owner:** U.S. Air Force **Well No.:** MW - 11



Site Sketch

**Location:** Disposal **Field Book No.:** 1 pp 31-44  
Site D-4 **Log By:** Andris Lapins  
**Driller:** Calvin Wallace (Delmarva)  
**Rig Type:** Falling 1250 Hydraulic Rotary  
**Reference Point:** Land Surface **Total Depth:** 55' BLS  
**Reference Point Elevation:** 19.75' **Date** 10/25/84 **Time** 1200 hrs  
**Drilling Started:** 10/25/84 1200 hrs  
**Drilling Completed:** 10/26/84 1150  
**Water Level:** 10.7' BLS 10/29/84

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	Legend	DESCRIPTION	Gradation
				SI: Sampling Interval RE: Recovery SS: Split Spoon C: Cuttings		Trace 1-12% Little 12-20% Some 20-30% Add "Y" >30%
0						
		C			Brown fine sand, some silt.	
5		SS#1		SI: 5-7' BLS	RE: 1.4'	
			7		0.8' - Olive yellow (5Y 6/6) silty clay, trace very fine sand	
			9		grading to olive yellow clay, some silt; brown to	
			8		yellow brown mottling throughout; moist; firm.	
			11		0.2' - Light olive brown (2.5Y 5/4) clay, some silt; strong	
					brown mottling; moist; soft; dense.	
					0.4' - Gray medium sand, some clay, few pebbles; brown	
					mottling; moist; firm.	
10						




**DRILLING LOG**

MW- 11 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
10		SS#2	9	SI: 10-12' BLS RE: 1.4'
			19	0.5' - Gray (5Y 6/1) clay; moist; soft, dense.
			26	0.45' - Gray (2.5Y 5/5) fine to medium sand, trace silt and
			40	clay, few rounded quartz pebbles. Cement-like in
				appearance.
				0.45' - Yellowish brown (10YR 5/8) fine to medium sand, trace
				silt and clay.
15		SS#3		SI: 15-16.5' BLS RE: 1.5'
			9	1.2' - Brownish yellow (10YR 6/8) fine sand, trace silt; wet.
			6	0.3' - Pale yellow (2.5Y 7/4) fine sand; wet.
			10	
20		SS#4		SI: 20-22' BLS RE: 0.6'
			10	0.6' - Pale yellow (5Y 7/3) fine to coarse sand, some
			8	gravel; poorly sorted; few emerald green spots -
			10	mineral.
			11	
25				

**DRILLING LOG**

MW- 11 cont.

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	DESCRIPTION
25		SS#5	12	SI: 25-27' BLS RE: 0.7'
			15	0.7' - Same as above
			14	
			16	
30		SS#6		SI: 30-32' BLS RE: 0.5'
			12	0.5' - Same as above
			13	
			15	
			12	
35		SS#7		SI: 35-37' BLS RE: 0.75'
			11	0.75 - Same as above
			8	
			15	
			21	
40				





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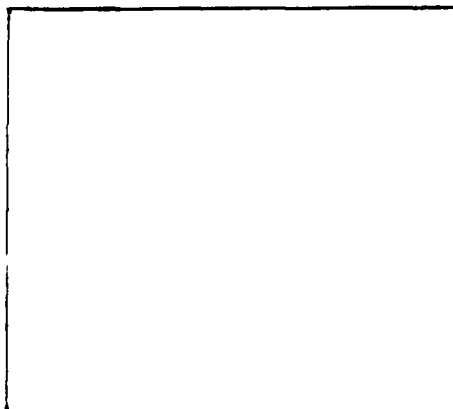
## WELL CONSTRUCTION SUMMARY

Project: Dover AFB Owner: U.S. Air Force Well No.: MW- 12

	<b>Drilling Summary:</b>			
	Total Depth: <u>55' BLS</u>		Drillers: <u>Gary Truver</u>	
	Borehole Diameter(s): <u>6"</u>		Walton Drilling	
	Rig Type: <u>CME-55 : Auger</u>			
	Elevation: Land Surface: <u>19.74'</u>		Bit(s): <u>Auger</u>	
	Top of Casing: <u>21.81'</u>		Drilling Fluid Type: <u>Water</u>	
	Supervisory Geologist: <u>Andris Lapins</u>		Amount Use: <u></u>	
	Log Book No. <u>1</u> pp. <u>46-54</u>		Water Level: <u>10.91' BLS 1/9/85</u>	
	<b>Well Design:</b>			
	Casing: Material: <u>PVC</u>		Screen: Material: <u>PVC</u>	
	Diameter: <u>2"</u> ID <u>2 1/4"</u> OD		Diameter: <u>2"</u>	
	Length: <u>13'</u>		Slot: <u>0.010; 5/16 inch</u>	
	Filter: Material: <u>Formation /40 Sand</u>		Setting: <u>11'-55' BLS</u>	
	Setting: <u>13.5'-55' BLS/9'-13.5' BLS</u>		Seals: Type: <u>Bentonite</u>	
	Grout: Type: <u>#1 Portland Cement/Ben</u>		Setting: <u>6.5'-9' BLS</u>	
	Setting: <u>2.5'-6.5' BLS</u>		Surface Casing: <u>Steel/PVC</u>	
	Other: <u>Protective steel casing cemented in to land surface.</u>			
	<b>Time Log:</b>			
		<b>Started</b>		<b>Completed</b>
	Drilling:	<u>10/26/84</u>	<u>1510 hrs</u>	<u>10/29/84 1220 hrs</u>
	Installation:	<u>10/29/84</u>	<u>1309 hrs</u>	<u>10/29/84 1337 hrs</u>
	Water Level Reading:			<u>1/9/85 10.91 BLS</u>
	Development :			
	<b>Well Development:</b>			
	Method/Equipment: <u>Air Blown for 8 hours, pumped at 10 gpm</u>			
	<u>for minimum 2 hours and until clear.</u>			

**DRILLING LOG**

**Project:** Dover AFB **Owner:** U.S. Air Force **Well No.:** MW- 12



Site Sketch

**Location:** Disposal **Field Book No.:** 1 pp 46-54  
Site D-4 **Log By:** Andris Lapins/Rick Eades  
**Driller:** Gary Truver (Walton)  
**Rig Type:** CME-55 : Auger  
**Reference** **Total**  
**Point:** Land Surface **Depth:** 55' BLS  
**Reference** **Date** **Time**  
**Point**  
**Elevation:** 19.74' **Drilling Started:** 10/26/84 1510  
**Drilling Completed:** 10/29/84 1337  
**Water Level:** 10.91' BLS 1/9/85

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	Legend	DESCRIPTION	Gradation
				SI: Sampling Interval RE: Recovery SS: Split Spoon C: Cuttings		Trace 1-12% Little 12-20% Some 20-30% Add "Y" >30%
0						
		SS#1		SI: 4-5.5' BLS		RE: 1.35'
			5	0.85' - Light to dark gray clay, some silt, trace gravel;		
			10	vertical streaks of staining; black laminations.		
5			10	0.5' - Reddish brown medium sand, some silt.		
		SS#2		SI: 9-10.5' BLS		RE: 1.35'
			3	0.35' - Gray clay, some silt, trace heavy gravel.		
10			5	1.0' - Light gray clay; streaks of iron staining.		

**DRILLING LOG**

MW - 12 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
10		SS#2	6	
		C		Light brown clay
		SS#3		SI: 14-15.5' BLS RE: 1.4'
			2	0.5' - Dark gray clay, some silt, trace sand, streaks of
			1	iron staining.
15			2	0.3' - Reddish brown fine sand, trace silt.
				0.6' - Light gray medium sand, trace silt; wet.
		SS#4		SI: 19-20.5' BLS RE: 1.0'
			2	1.0' - Light gray (5Y 7/1) fine sand, trace silt; wet.
			3	
20			4	
		SS#5		SI: 24-25.5' BLS RE: 1.2'
			8	1.2' - Brownish yellow (10YR 6/8) fine to coarse sand,
			7	trace gravel, few rounded pebbles; wet.
			7	
25				

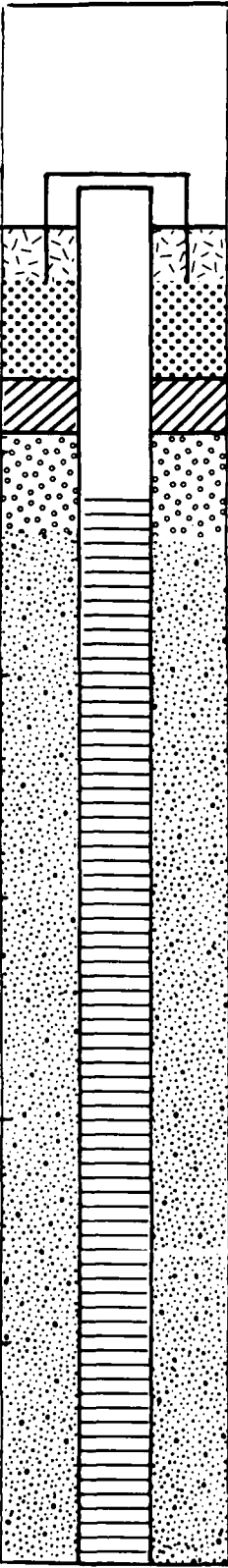




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**WELL CONSTRUCTION SUMMARY**

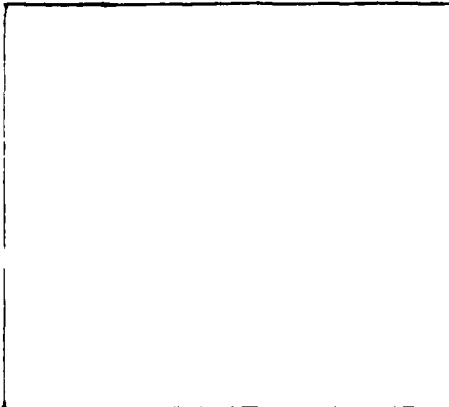
Project: Dover AFB Owner: U.S. Air Force Well No.: MW- 13

0'		<b>Drilling Summary:</b>	
		Total Depth: <u>61.5'</u>	Drillers: <u>Gary Truver</u>
		Borehole Diameter(s): <u>6"</u>	<u>Walton Corporation</u>
		Rig Type: <u>CME Auger</u>	
10'		Elevation: Land Surface: <u>20.36'</u>	Bit(s): <u>Hollow stem auger</u>
		Top of Casing: <u>22.97'</u>	Drilling Fluid Type: <u>None</u>
		Supervisory Geologist: <u>Richard Eades</u>	Amount Use: _____
		Log Book No. <u>4</u> pp. <u>65-83</u>	Water Level: <u>11.5' BLS 10/26/84</u>
20'		<b>Well Design:</b>	
		Casing: Material: <u>Schedule 40 PVC</u>	Screen: Material: <u>Schedule 40 PVC</u>
		Diameter: <u>2"</u> ID <u>2 3/8"</u> OD Diameter: <u>2"</u>	
		Length: <u>13.5'</u>	Slot: <u>0.010; 5 slots/inch</u>
30'		Filter: Material: <u>40 Sand</u>	Setting: <u>11.5-61.5'</u>
		Setting: <u>9.0-13.5'</u>	Seals: Type: <u>Bentonite</u>
		Grout: Type: <u>#1 Portland Cement/Ben</u>	Setting: <u>7.0-9.0'</u>
		Setting: <u>LS-7.0'</u>	Surface Casing: <u>Steel/PVC</u>
40'		Other: <u>Formation allowed to cave, providing natural sand pack from</u>	
		<u>13.5 - 61.5'. Protective steel casing cemented into</u>	
		<u>land surface.</u>	
50'		<b>Time Log:</b>	
		Started	Completed
		Drilling: <u>10/25/84 1630 hrs</u>	<u>10/26/84 1020 hrs</u>
		Installation: <u>10/26/84 1030 hrs</u>	<u>10/26/84 1405 hrs</u>
60'		Water Level Reading: <u>10/26/84 1150 hrs</u>	
		Development: _____	
		<b>Well Development:</b>	
		Method/Equipment: <u>Air blown for 8 hours, pumped at 10gpm</u>	
		<u>for minimum 2 hours and until clear.</u>	
		_____	
		_____	



**DRILLING LOG**

**Project:** Dover AFB **Owner:** U.S. Air Force **Well No.:** M-13



Site Sketch

**Location:** Disposal **Field Book No.:** 4 pp 65-83

**Area #4** **Log By:** Rick Eades

**Driller:** Gary Truver

**Rig Type:** CME Auger

**Reference** **Total**

**Point:** Land Surface **Depth:** 61.5'

**Reference** **Date** **Time**

**Point**

**Elevation:** 20.36' **Drilling Started:** 10/25/84 1630hr

**Drilling Completed:** 10/26/84 1020

**Water Level:** 11/5' 10/26/84 1150

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	Legend	DESCRIPTION	Gradation
				SI: Sampling Interval RE: Recovery SS: Split Spoon C: Cuttings		Trace 1-125 Little 12-207 Some 20-307 Add "Y" 307
0						
		C			Dark brown silt, some sand, some pebbles.	
		SS#1		SI: 4-5.5' BLS		RE: 1.2'
			4		0.2' - Dark brown (7.5YR 5/4) silt, some clay, trace sand.	
			6		0.8' - Dark grayish brown (5YR 6/2) sand, some silt,	
			8		trace clay.	
					0.2' - Brown (10YR 5/2) fine sand, some silt, trace clay.	
		C			Hit clay layer.	
		SS#2		SI: 9-10.5' BLS		RE: 1.5'
			4		0.3' - Brownish gray (7.5YR 5/2) silt, some clay.	
10			5		1.2' - Dark gray brown (7.5YR 5/0) clay, some silt,	

**DRILLING LOG**

MW- 13 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
10		SS#2	8	some pebbles.
		C		Light gray sand, moist.
		SS#3		SI: 14-15.5' BLS RE: 1.0'
			3	0.8' - Light gray (7.5YR 7/1) sand, some silt.
15			4	0.2' - Interbedded light gray silt and light brown
			5	sand, wet.
		C		Light gray sand, some silt, trace clay, moist.
		C		Brownish gray sand.
		SS#4		SI: 19-20.5' BLS RE: 1.2'
			2	0.5' - Brown (10YR 6/6) sand, some silt, trace clay.
20			3	0.7' - Light gray (7.5YR 7/0) coarse sand, trace silt.
			3	
		C		Light brownish gray sand, trace silt, wet.
		SS		Upon lowering split spoon sampler, discovered over 2.0' of
				heave (rock debris) lodged inside auger, determined sample
25				recovery would be impossible.

**DRILLING LOG**

MW- 13 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
25				
		C		Light grayish brown, coarse sand.
		SS#5		SI: 29-30.5' BLS RE: 0.9'
		6		0.3' - Light gray (5YR 7/1) sand, trace silt.
30		8		0.6' - Light gray (10YR 6/1) coarse sand, with
		13		disseminated very fine black grains.
		C		Light brown to light grayish brown, coarse sand.
		SS#6		SI: 34-35.5' BLS RE: 0.0'
		6		Attempted split spoon sample, no recovery, considered
		5		interval to be composed of clean sand.
35		7		
		C		Light grayish brown sand.
		SS#7		SI: 39-40.5' BLS RE: 0.0'
		5		Attempted split spoon sample, no recovery, considered
40		6		interval to be composed of clean sand.

DRILLING LOG

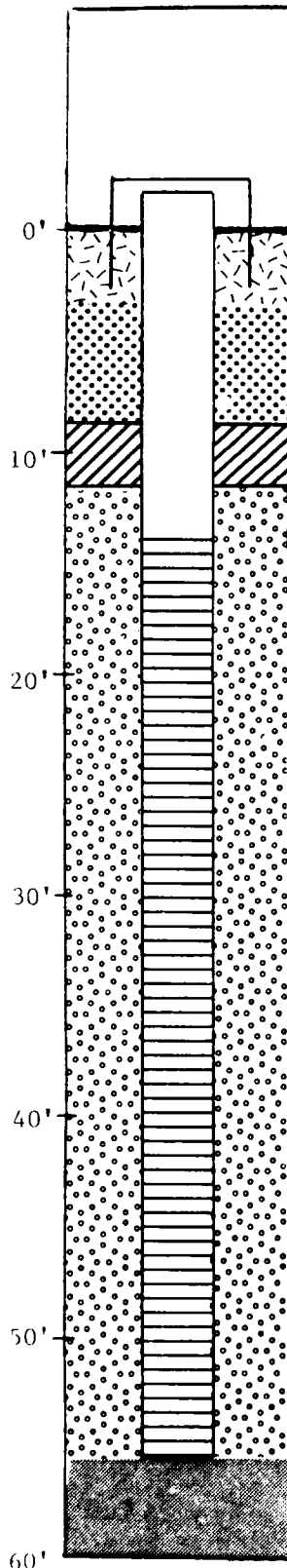
MW- 13 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
40		SS#7	10	
		C		Light grayish brown sand.
		SS#8		SI: 44-45.5' BLS RE: 0.3'
			4	0.3' - Light brown to tan, coarse sand and cobbles.
45			4	
			7	
		SS		Upon lowering split spoon sampler discovered over 2.0' of
				heave in augers, decided sample recovery would be impossible.
50				
		C		Brown, coarse sand and pebbles.
		SS#9		SI: 54-55.5' BLS RE: 0.0'
			12	Attempted split spoon sample, no recovery, considered
55			18	interval to be composed of clean sand.

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## WELL CONSTRUCTION SUMMARY

Project: Dover AFB Owner: U.S. Air Force Well No.: MW- 14



### Drilling Summary:

Total Depth: 56' Drillers: Calvin Wallace  
Borehole Diameter(s): 8" Delmarva Drilling  
Rig Type: Failing 1250 Hydraulic Rotary  
Elevation: Land Surface: 19.12' Bit(s): Drag  
Top of Casing: 21.16' Drilling Fluid Type: Water  
Supervisory Geologist: Richard Eades Amount Use:   
Log Book No. 4 pp. 106-115 Water Level: 15.2' 11/14/84

### Well Design:

Casing: Material: PVC Screen: Material: PVC  
Diameter: 2" ID 2 3/8" OD Diameter: 2"  
Length: 15' Slot: 0.010; 5/inch  
Filter: Material: 40 Sand Setting: 13-56'  
Setting: 11-56' Seals: Type: Bentonite  
Grout: Type: #1 Portland Cement/Ben Setting: 9-11'  
Setting: LS-9.0' Surface Casing: Steel/PVC  
Other: Protective steel casing cemented in to land surface.

### Time Log:

#### Started

#### Completed

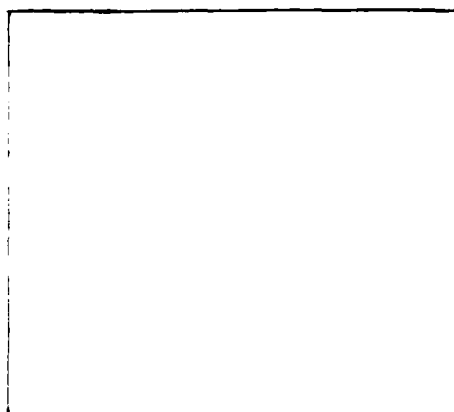
	Started	Completed
Drilling:	11/1/84 0800 hrs	11/1/84 1145 hrs
Installation:	11/1/84 1250 hrs	11/1/84 1509 hrs
Water Level Reading:		11/14/84 1532 hrs
Development:		

### Well Development:

Method/Equipment: Air blown for 8 hours, pumped at 10gpm  
for minimum 2 hours and until clear.

**DRILLING LOG**

Project: Dover AFB Owner: U.S. Air Force Well No.: MW- 14



Site Sketch

Location: Fire Training Field Book No.: 4 pp 106-115

Area #1 Log By: Rick Eades

Driller: Calvin Wallace

Rig Type: Failing 1250 Hydraulic Rotary

Reference Point: Land Surface Total Depth: 56'

Reference Point Date Time

Elevation:                      Drilling Started: 11/1/84 0800hrs

Drilling Completed: 11/1/84 1145

Water Level: 15.2' 11/14/84 1532

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	Legend	DESCRIPTION	Gradation
				SI: Sampling Interval RE: Recovery SS: Split Spoon C: Cuttings		Trace 1-12' Little 12-20' Some 20-30' Add "y" 30'
0						
		C			Brown medium to coarse sand, some silt, some pebbles.	
		SS#1		SI: 5-7' BLS		RE: 0.9'
			13		0.4' - light gray (5YR 7/1) cobbles, some coarse sand,	
			28		trace silt.	
			31		0.5' - White medium sand.	
			34			
		C			Light brown medium sand, some fine sand, trace silt.	

DRILLING LOG

MW- 14 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
10		SS#2	9	SI: 10-12' BLS RE: 0.0'
			9	Attempted split spoon sample, no recovery, considered
			7	interval to be composed of clean sand.
			11	
		C		Tan to light brown, very coarse sand, some pebbles.
15		SS#3		SI: 15-17' BLS RE: 0.5'
			8	0.5' - Light gray (5YR 7/1) medium sand, some fine sand,
			3	trace silt.
			3	
			4	
		C		Tan cobbles, very coarse sand.
20		SS#4		SI: 20-22' BLS RE: 0.5'
			6	0.5' - Gray brown to tan (7.5YR 7/2) coarse sand,
			5	cobbly, trace fine sand.
			9	
			16	
		C		Light gray brown pebbles, some cobbles.
25				



Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
25		SS#5	7	SI: 25-27' BLS RE: 0.0'
			10	Attempted split spoon sample, no recovery, considered
			12	interval to be composed of clean sand.
			15	
		C		Tan to white, coarse sand, some pebbles
30		SS#6		SI: 30-32' BLS RE: 0.0'
			14	Attempted split spoon sample, no recovery, considered
			17	interval to be composed of clean sand.
			19	
			25	
		C		Light grayish brown cobbles, some pebbles.
35		SS#7		SI: 35-37' BLS RE: 0.0'
			10	Attempted split spoon sample, no recovery, considered
			11	interval to be composed of clean sand.
			12	
			22	
		C		White to brown cobbles.
40				


DRILLING LOG

MW- 14 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
40		SS#8	22	SI: 40-42' BLS RE: 0.5'
			28	0.5' - Medium to dark orange brown (10YR 6/8), very
			24	coarse sand, some cobbles, trace fine sand.
			33	
		C		Medium orange brown, coarse sand, some pebbles.
45		SS#9		SI: 45-47' BLS RE: 0.5'
			16	0.5' - Dark reddish brown (10YR 5/6) coarse sand,
			17	some pebbles, trace silt, trace clay.
			23	
			30	
		C		Orange brown pebbles and coarse sand.
50		SS#10		SI: 50-51' BLS RE: 0.4'
			51	0.4' - Yellowish brown (10YR 6/8) coarse sand,
			200	trace fine sand, trace cobbles.
				Note: Only sampled 1.0' interval because cobble became
				lodged in sampler.
		C		Pebbles and coarse sand, trace silt, trace clay.
55				

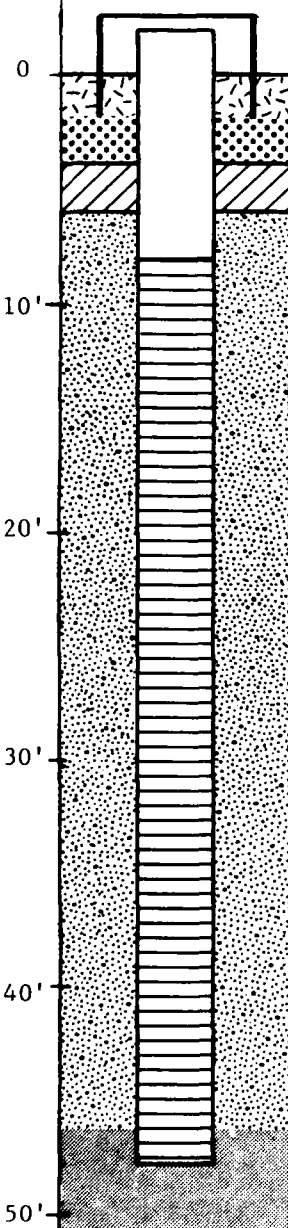
## DRILLING LOG

MW- 14 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION	
55		SS#11	100	SI: 55-55.6' BLS RE: 0.2'	
			100*	0.2' - Dark orange brown (10YR 5/6) coarse sand, trace fine sand.	
				*Note: Cobble lodged in sampler and rejected sampler at 55.6'.	
		C		Coarse sand with very dark gray clay at 57.0'	
				Drilling rate changed at approximately 56' BLS, probably hit top of the clay layer.	
60			SS#12		SI: 60-62' BLS RE: 2.0'
				18	2.0' - Dark gray (5Y 4/1) clay, silty, dense,
				14	finely laminated.
				27	
	</				

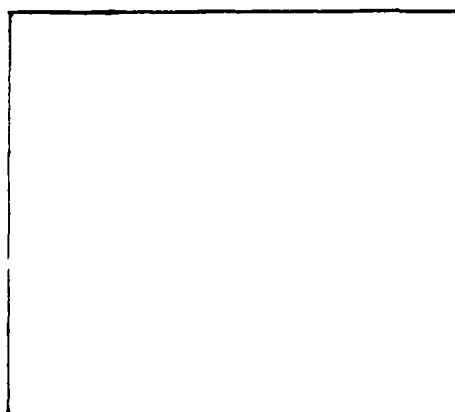
**WELL CONSTRUCTION SUMMARY**

Project: Dover AFB Owner: U.S. Air Force Well No.: MW- 15

	<b>Drilling Summary:</b> Total Depth: <u>48' BLS</u> Drillers: <u>Gary Truver</u> Borehole Diameter(s): <u>6"</u> (Walton Drilling) Rig Type: <u>CME-55 : Auger</u> Elevation: Land Surface: <u>9.21'</u> Bit(s): <u>Auger</u> Top of Casing: <u>11.11'</u> Drilling Fluid Type: <u>Water</u> Supervisory Geologist: <u>Andris Lapins</u> Amount Use: _____ Log Book No. <u>2</u> pp. <u>30-42</u> Water Level: <u>6.7' BLS 11/2/83</u>																												
	<b>Well Design:</b> Casing: Material: <u>PVC</u> Screen: Material: <u>PVC</u> Diameter: <u>2"</u> ID <u>2 1/4"OD</u> Diameter: <u>2"</u> Length: <u>10'</u> Slot: <u>0.010; 5/inch</u> Filter: Material: <u>Formation/4Q Sand</u> Setting: <u>8-48' BLS</u> Setting: <u>6.3-48' BLS/5.9-6.3' BLS</u> Seals: Type: <u>Bentonite</u> Grout: Type: <u>#1 Portland Cement/Ben</u> Setting: <u>3.9'-5.9' BLS</u> Setting: <u>2.5'-3.9' BLS</u> Surface Casing: <u>Steel/PVC</u> Other: <u>Protective steel casing cemented in to land surface.</u>																												
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Time Log:</th> <th colspan="2" style="text-align: center;">Started</th> <th colspan="2" style="text-align: center;">Completed</th> </tr> </thead> <tbody> <tr> <td>Drilling:</td> <td style="text-align: center;">11/2/84</td> <td style="text-align: center;">1312 hrs</td> <td style="text-align: center;">11/5/84</td> <td style="text-align: center;">1432 hrs</td> </tr> <tr> <td>Installation:</td> <td style="text-align: center;">11/5/84</td> <td style="text-align: center;">1446 hrs</td> <td style="text-align: center;">11/5/84</td> <td style="text-align: center;">1648 hrs</td> </tr> <tr> <td>Water Level Reading:</td> <td style="text-align: center;">6.7' BLS</td> <td style="text-align: center;">1344 hrs</td> <td style="text-align: center;">11/8/84</td> <td style="text-align: center;">4.92' BLS</td> </tr> <tr> <td>Development :</td> <td colspan="2"></td> <td colspan="2"></td> </tr> </tbody> </table>				Time Log:	Started		Completed		Drilling:	11/2/84	1312 hrs	11/5/84	1432 hrs	Installation:	11/5/84	1446 hrs	11/5/84	1648 hrs	Water Level Reading:	6.7' BLS	1344 hrs	11/8/84	4.92' BLS	Development :				
	Time Log:	Started		Completed																									
Drilling:	11/2/84	1312 hrs	11/5/84	1432 hrs																									
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Water Level Reading:	6.7' BLS	1344 hrs	11/8/84	4.92' BLS																									
Development :																													
<b>Well Development:</b> Method/Equipment: <u>Air blown for 8 hours, pumped at</u> <u>10gpm for minimum 2 hours and until clear.</u>																													

**DRILLING LOG**

**Project:** Dover AFB **Owner:** U.S. Air Force **Well No.:** NW - 15



Site Sketch

**Location:** Fire Training **Field Book No.:** 2 pp 30-42  
**Area #1** **Log By:** Andris Lapins  
**Driller:** Gary Gruver (Walton)  
**Rig Type:** CME-55 : Auger  
**Reference Point:** Land Surface **Total Depth:** 48' BLS  
**Reference Point Elevation:** 9.21' **Date** 11/2/84 **Time** 1312 hrs  
**Drilling Started:** 11/2/84 1312 hrs  
**Drilling Completed:** 11/5/84 1432  
**Water Level:** 6.7' BLS 11/2/84

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	Legend	DESCRIPTION	Gradation
				SI: Sampling Interval RE: Recovery SS: Split Spoon C: Cuttings		Trace 1-12% Little 12-20% Some 20-30% Add "Y" >30%
0						
		C			Light brown fine sand and silt. Heavy gravel layer at @ 3' BLS.	
		SS#1		SI: 4-6' BLS RE: 1.6		
			8		1.6' - White to pale yellow (5Y 8/2-8/3) medium to	
5			7		coarse sand, some silt, trace clay, trace heavy	
			8		gravel (rounded pebbles at top of sample); poorly	
			8		sorted; reworked "urban" soils; moist; lower half of sample wet.	
					Cuttings saturated at @ 8' BLS.	
		SS#2		SI: 9-11' BLS RE: 1.8'		
			1		1.8' - White (5Y 8/2) fine sand, some silt, trace clay	
10			1		and gravel; few pebbles; emerald green specks	

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
10		SS#2	1	(mineral) throughout; loose; saturated.
			3	
				Water level in auger 6.7' BLS.
		SS#3		SI: 14-16' BLS RE: 1.7'
			2	1.7' - Same as above
			1	
15			1	
			2	
		SS#4		SI: 19-21' BLS RE: 1.0'
			3	0.8' - Same as above
			3	0.4' - Pale yellow (2.5Y 8/4) coarse sand and light gravel,
20			5	some silt, trace clay; poorly sorted; loose; wet.
			6	
		SS#5		SI: 24-26' BLS RE: 0.8'
			5	0.8' - Same as above with few large rounded pebbles
25			3	near top.

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	DESCRIPTION
25		SS#5	4	
			5	
		SS#6		SI: 29-31' BLS RE: 0.4'
			9	0.4' - Strong brown (7.5YR 5/8) medium to coarse sand and
30			9	gravel, some silt, trace clay; poorly sorted; wet.
			11	
			11	
		SS#7		SI: 34-36' BLS RE: 0.8'
			10	0.2' - Same as above
35			9	0.4' - Pinkish white (7.5YR 8/2 medium to coarse sand,
			9	some gravel and silt, trace clay; poorly sorted; wet.
			22	0.2' - Same as 0.2' above with several large rounded quartz
				pebbles
		SS#8		SI: 39-41' BLS RE: 1.3'
			23	1.3' - Reddish yellow (7.5YR 6/8) fine sand, some silt;
40			33	gravel stringer at top, bottom and middle; wet.

**DRILLING LOG**

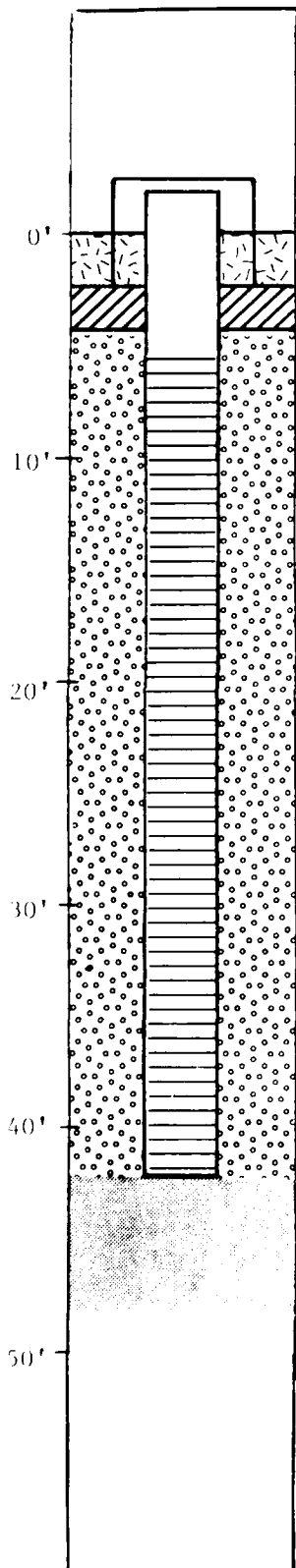
MW- 15 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
40		SS#8	50	
			110/4'	
				Water level in auger 8.1' BLS.
		SS#9		SI: 44-46' BLS RE: None
			7	Sands heaved/filled in auger @ 4'. Unable to flush out
			9	and obtain clean sample.
45			13	
			10	Note: Estimated depth to top of Kirkwood Fm. - 45' BLS.
		SS#10		SI: 49-51' BLS RE: 1.0'
			3	1.0' - Very dark gray to black silty clay, trace very fine
			4	sand; light gray very fine sand and silt laminations;
50			5	firm; dense.
			6	
				Last auger flight (5') covered with Kirkwood clay. See
				note above.
55				



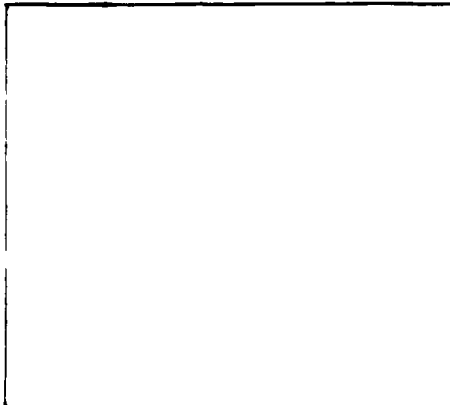
**WELL CONSTRUCTION SUMMARY**

Project: Dover AFB Owner: U.S. Air Force Well No.: MW- 16

	<b>Drilling Summary:</b> Total Depth: <u>42.5'</u> Drillers: <u>Calvin Wallace</u> Borehole Diameter(s): <u>8"</u> <u>Delmarva Drilling</u> Rig Type: <u>Failing 1250 Hydraulic Rotary</u> Elevation: Land Surface: <u>8.49</u> Bits: <u>Drag</u> Top of Casing: <u>10.57'</u> Drilling Fluid Type: <u>Water</u> Supervisory Geologist: <u>Richard Eades</u> Amount Use: _____ Log Book No. <u>5</u> pp. <u>2-8</u> Water Level: <u>6.5' BLS</u> <u>11/14/84</u>																		
	<b>Well Design:</b> Casing: Material: <u>PVC</u> Screen: Material: <u>PVC</u> Diameter: <u>2"</u> ID <u>2 3/8"OD</u> Diameter: <u>      </u> Length: <u>8'</u> Slot: <u>0.010; 5/16 inch</u> Filter: Material: <u>40 Sand</u> Setting: <u>6-42.5'</u> Setting: <u>4-42.5'</u> Seals: Type: <u>Bentonite</u> Grout: Type: <u>#1 Portland Cement/Ben</u> Setting: <u>2-4'</u> Setting: <u>LS-4.0'</u> Surface Casing: <u>Steel/PVC</u> Other: <u>Protective steel casing cemented in to land surface.</u>																		
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">Time Log:</th> <th style="width: 20%;">Started</th> <th style="width: 20%;">Completed</th> </tr> </thead> <tbody> <tr> <td>Drilling:</td> <td><u>11/5/84 0935 hrs</u></td> <td><u>11/5/84 1325 hrs</u></td> </tr> <tr> <td>Installation:</td> <td><u>11/5/84 1330 hrs</u></td> <td><u>11/5/84 1515 hrs</u></td> </tr> <tr> <td>Water Level Reading:</td> <td></td> <td><u>11/14/84 1620 hrs</u></td> </tr> <tr> <td>Development:</td> <td></td> <td></td> </tr> </tbody> </table>				Time Log:	Started	Completed	Drilling:	<u>11/5/84 0935 hrs</u>	<u>11/5/84 1325 hrs</u>	Installation:	<u>11/5/84 1330 hrs</u>	<u>11/5/84 1515 hrs</u>	Water Level Reading:		<u>11/14/84 1620 hrs</u>	Development:		
	Time Log:	Started	Completed																
Drilling:	<u>11/5/84 0935 hrs</u>	<u>11/5/84 1325 hrs</u>																	
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Water Level Reading:		<u>11/14/84 1620 hrs</u>																	
Development:																			
<b>Well Development:</b> Method/Equipment: <u>Air blown for 8 hours, purged at 100pm</u> <u>for minimum 2 hours and until clear.</u>																			

**DRILLING LOG**

Project: Dover AFB Owner: U.S. Air Force Well No.: MW- 16



Site Sketch

Location: Fire Training Field Book No.: 5 PP 2-8

Area #1 Log By: Rick Eades

Driller: Calvin Wallace

Rig Type: Failing 1250 Hydraulic Rotary

Reference Total

Point: Land Surface Depth: 42.5

Reference Date Time

Point

Elevation: 8.49' Drilling Started: 11/5/84 0935hr

Drilling Completed: 11/5/84 1325

Water Level: 6.5' 11/14/84 1620

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	Legend	Gradation
				DESCRIPTION	
0				SI: Sampling Interval	Trace 1-12%
				RE: Recovery	Little 12-20%
				SS: Split Spoon	Some 20-30%
				C: Cuttings	Add "Y" >30%
		C		Light brown, cobbles, some sand, trace silt, trace clay.	
5		SS#1		SI: 5-7' BLS	RE: 0.6'
		5		0.6' - Light brown to whitish brown (10YR 7/3) coarse	
		5		sand, cobbly, trace silt, trace clay.	
		4			
		6			
		C		Light brown, coarse sand, cobbly, trace silt, trace clay.	
10					

DRILLING LOG

MW- 16 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
10		SS#2	8	SI: 10-12' BLS RE: 0.0'
			8	Attempted split spoon sample, no recovery, considered
			7	interval to be composed of clean sand.
			11	
		C		Light brown, coarse to medium sand, trace silt, trace pebbles.
15		SS#3		SI: 15-17' BLS RE: 0.0'
			6	Attempted split spoon sample, no recovery, considered
			6	interval to be composed of clean sand.
			9	
			13	
		C		Light yellowish brown, coarse to medium sand.
20		SS#4		SI: 20-22' RE: 0.0'
			10	Attempted split spoon sample, no recovery, considered
			5	interval to be composed of clean sand.
			10	
			15	
		C		Light to medium brown, coarse sand, some pebbles.
25				






DRILLING LOG

MW- 16 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
25		SS#5	16	SI: 25-27' BLS RE: 1.5'
			18	1.5' - Yellowish brown (10YR 5/8) coarse to medium sand,
			20	trace silt, trace pebbles.
			31	
		C		Yellowish brown coarse sand.
30		SS#6		SI: 30-32' BLS RE: 0.0'
			18	Attempted split spoon sample, no recovery, considered
			21	interval to be composed of clean sand.
			20	
			23	
		C		Yellowish brown, coarse sand and pebbles.
35		SS#7		SI: 35-37' BLS RE: 0.0'
			21	Attempted split spoon sample, no recovery, considered
			19	interval to be composed of clean sand.
			17	
			18	
		C		Yellowish brown, coarse sand and pebbles.
40				

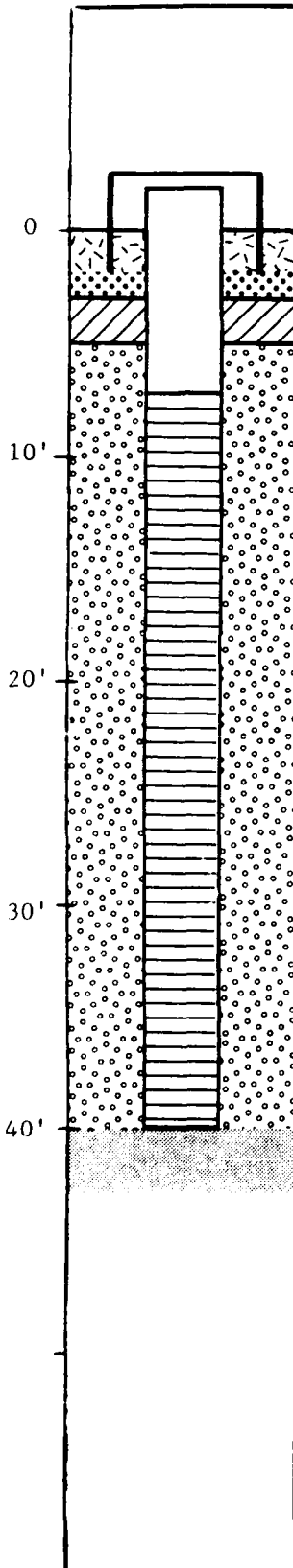
DRILLING LOG

MW- 16 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
40		SS#8	44	SI: 40-41' BLS RE: 0.6'
			100	0.6' - Dark brown (7.5YR 5/8) coarse to medium sand, cobbly
				Note: Only penetrated 1.0' since cobble became lodged in sampler.
				Driller indicated contact with clay layer at 42.5' BLS
		C		Light brown, coarse to medium sand and dark gray clay.
45		SS#9		SI: 45-47' BLS RE: 2.0'
			8	2.0' - Dark gray (5Y 4/1) clay, silty, dense.
			14	finely laminated.
			23	
			32	
				
50				
55				

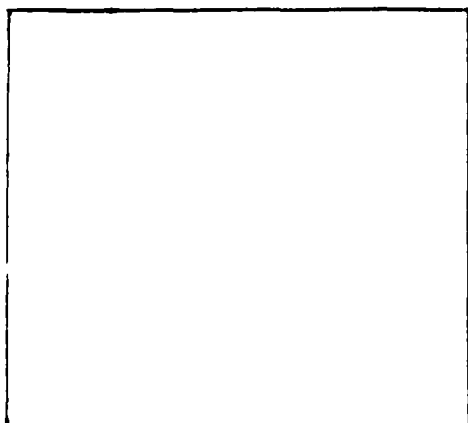
## WELL CONSTRUCTION SUMMARY

Project: Dover AFB Owner: U.S. Air Force Well No.: MW - 17

	<b>Drilling Summary:</b>																		
	Total Depth: <u>40' BLS</u>		Drillers: <u>Calvin Wallace</u>																
	Borehole Diameter(s): <u>6 1/2"</u>		Delmarva Drilling																
	Elevation: Land Surface: <u>8.4'</u>		Rig Type: <u>Failing 1250 Hydraulic Rotary</u>																
	Top of Casing: <u>10.27'</u>		Bit(s): <u>Drag</u>																
	Supervisory Geologist: <u>Andris Lapins</u>		Amount Use: <u></u>																
	Log Book No. <u>3</u> pp. <u>29-37</u>		Water Level: <u>5.2' BLS</u> 1/9/85																
	<b>Well Design:</b>																		
	Casing: Material: <u>PVC</u>		Screen: Material: <u>PVC</u>																
	Diameter: <u>2"</u> ID <u>2 1/4"</u> OD		Diameter: <u>2"</u>																
	Length: <u>9'</u>		Slot: <u>0.010; 5/16 inch</u>																
	Filter: Material: <u>4Q Sand</u>		Setting: <u>7-40' BLS</u>																
	Setting: <u>4.9-40' BLS</u>		Seals: Type: <u>Bentonite</u>																
	Grout: Type: <u>#1 Portland Cement/Ben</u>		Setting: <u>3-4.9' BLS</u>																
	Setting: <u>2-3' BLS</u>		Surface Casing: <u>Steel/PVC</u>																
	Other: <u>Protective steel casing cemented in to land surface.</u>																		
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Time Log:	Started	Completed																	
Drilling:	11/13/84 1030 hrs	11/13/84 1357 hrs																	
Installation:	11/13/84 1412 hrs	11/13/84 1505 hrs																	
Water Level Reading:		1/9/85 5.2' BLS																	
Development:																			
	<b>Well Development:</b>																		
	Method/Equipment: <u>Air blown for 8 hours, pumped at</u>																		
	<u>10 gpm for minimum 2 hours and until clear.</u>																		

**DRILLING LOG**

Project: Dover AFB Owner: U.S. Air Force Well No.: MW- 17



Site Sketch

Location: Fire Training Area #1 Field Book No.: 3 pp 29-37  
Log By: Andris Lapins  
Driller: Calvin Wallace (Delmarva)  
Rig Type: Failing 1250 Hydraulic Rotary  
Reference Point: Land Surface Total Depth: 40' BLS  
Reference Point Elevation: 8.4' Date 11/13/84 Time 1030 hrs  
Drilling Started: 11/13/84 1030 hrs  
Drilling Completed: 11/13/84 1505  
Water Level: 5.2' BLS 1/9/85

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	Legend	DESCRIPTION	Gradation
				SI: Sampling Interval RE: Recovery SS: Split Spoon C: Cuttings		Trace 1-12% Little 12-20% Some 20-30% Add "Y" >30%
0						
5		SS#1		SI: 5-7' BLS		RE: 0.9'
			7		0.7'- Pale yellow to white fine sand, some silt; emerald	
			7		green spots in sand-mineral; loose; wet.	
			5		0.2'- Reddish yellow fine sand, some silt; loose; wet.	
			8			
10						

**DRILLING LOG**

NW - 17 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
10		SS#2	11	SI: 10-12' BLS RE: 1.5'
			14	0.4' - Reddish yellow fine silty sand; few small iron
			14	concretions at top and bottom; wet.
			13	0.2' - White very fine to fine sand, some silt; wet.
				0.6' - Dark brown silty very fine sand; large iron
				concretions at top and bottom; wet.
				0.3' - Pale yellow fine sand, some silt; wet.
15		SS#3		SI: 15-17' BLS RE: 0.8'
			8	0.8' - Yellow medium to coarse sand, some silt, trace
			8	gravel; loose; wet.
			9	
			16	
20		SS#4		SI: 20-22' BLS RE: 0.3'
			10	0.3' - Same as above
			12	
			13	
			13	
25				Formation taking on water; drilling mud thickened.



**DRILLING LOG**

MW - 17 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
25	0.5' G	SS#5	16	SI: 25-27' BLS RE: 0.5'
			38	0.5' - Reddish yellow medium to coarse sand, some silt
			31	and light gravel, trace clay; few rounded quartz
			42	pebbles; poorly sorted; wet.
30	0.3' G	SS#6		SI: 30-32' BLS RE: 0.3'
			21	0.3' - Same as above. Much heavy gravel (wash material in
			40	bottom of hole) inhibiting sample collection and
			46	recovery.
			76	
35	0.4' G	SS#7		SI: 35-37' BLS RE: 0.4'
			11	0.4' - Same as above
			18	
			22	
			31	
40				

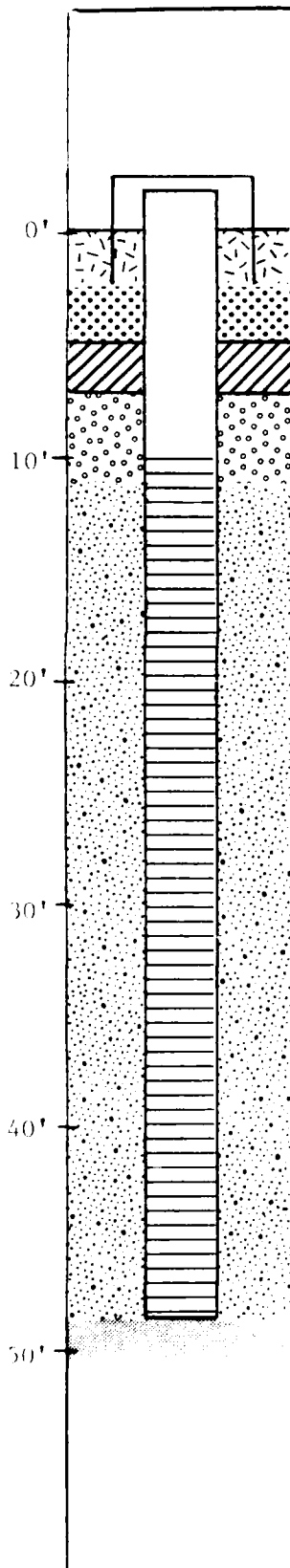
# DRILLING LOG

MW - 17 cont.

[illegible]

**WELL CONSTRUCTION SUMMARY**

Project: Dover AFB Owner: U.S. Air Force Well No.: WW-18



**Drilling Summary:**

Total Depth: 48.5' Drillers: Carl Truver  
Borehole Diameter: 2" Walton Corporation  
Rig Type: CMI Auger  
Elevation: Land Surface: 18.13' Bits: Hollow stem auger  
Top of Casing: 19.73' Drilling Fluid Type: None  
Supervisory Geologist: Richard Eades Amount Use:   
Log Book No. 4 pp. 23-49 Water Level: 11' BLS 10/24/84

**Well Design:**

Casing: Material: Schedule 40 PVC Screen: Material: Schedule 40 PVC  
Diameter: 2" ID 2 3/8"OD Diameter: 2"  
Length: 12.5' Slot: 0.010; 5 slots/inch  
Filter: Material: 4Q Sand Setting: 10.5-48.5'  
Setting: 7.0-11.0' Seals: Type: Bentonite  
Grout: Type: #1 Portland Cement/Ben Setting: 5.0-7.0'  
Setting: LS-5.0' Surface Casing: Steel PVC  
Other: Formation allowed to cave, providing natural sand pack from  
11.0' - 48.5'. Protective steel casing cemented into  
land surface.

**Time Log:**

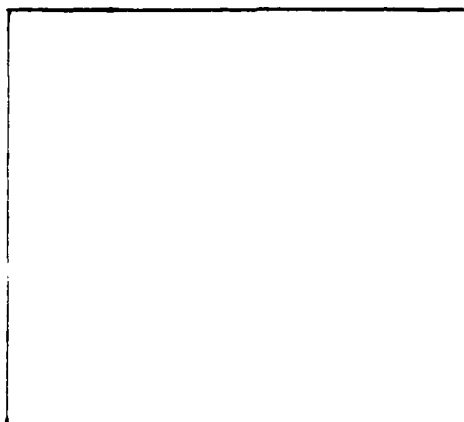
**Started**

**Completed**

Drilling:	<u>10/23/84</u>	<u>0930 hrs</u>	<u>10/24/84</u>	<u>1500 hrs</u>
Installation:	<u>10/24/84</u>	<u>1500 hrs</u>	<u>10/24/84</u>	<u>1530 hrs</u>
Water Level Readings:			<u>10/24/84</u>	<u>1100 hrs (11')</u>
Development:				

**Well Development:**

Method/Equipment: Air blower and surging tool joint, 1000 ft  
10gpm for minimum 2 hour run, until clear.

**DRILLING LOG**Project: Dover AFBOwner: U.S. Air ForceWell No.: MW- 18

Site Sketch

Location: Fire Training Field Book No.: 4 PP23-49

Area #3

Log By: Rick EadesDriller: Gary TruverRig Type: CME Auger

Reference

Point: Land Surface

Total

Depth: 48.5'

Reference

Point

Elevation: 18.13'





Date Time

Drilling Started: 10/23/84 0934hrDrilling Completed: 10/24/84 1500Water Level: 11' 10/24/84 1100

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	Legend	DESCRIPTION	Gradation
				SI: Sampling Interval RE: Recovery SS: Split Spoon C: Cuttings		Trace 1-12% Little 12-20% Some 20-30% Add "Y" 30%
0						
		C			Light grayish brown clay with some silt.	
		SS#1		SI: 4-5.5' BLS	RE: 1.5'	
			6		1.5' - Grayish brown (5YR 5/1) clay, some silt, trace	
5			7		sand; thin orange streaks near bottom of sample.	
			6			
		C			Light reddish brown sand, some silt, trace clay.	
		SS#2		SI: 9-10.5' BLS	RE: 1.4'	
			3		0.3' - Brown medium sand	
10			4		0.5' - Grayish brown medium sand, some silt	

DRILLING LOG

MW- 18 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
10		SS#2	5	0.6' - Light to brownish gray medium to fine sand, some silt
		C		light gray sand, some silt.
		SS#3		SI: 14-15.5' RE: 1.2'
			1	1.2' - Light gray fine to medium sand, some silt trace
15			1	clay, some quartz pebbles; interbeds of reddish
			3	orange sand. Sample moist.
		C		Light gray sand, some silt.
		SS#4		SI: 19-20.5' BLS RE: 0.8'
			5	0.8' - Light gray brown (10YR 8/3) coarse sand and semi-
20			5	rounded quartz pebbles. Sample moist.
			7	
		C		Tan, coarse to very coarse sand.
		C		Coarse sand, some clay.
		SS#5		SI: 24-25.5' BLS RE: 0.6'
			7	0.2' - Light gray (5YR 5/1) coarse sand.
25			6	0.1' - Orange to reddish brown clay.

**DRILLING LOG**

MW- 18 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
25		SS#5	9	0.3' - Interbedded orange brown clay and silt. Sample wet.
		C		Gravel layer, approximately 0.5-1.0' thick.
		SS#6		SI: 29-30.5' BLS RE: 1.2'
		7		0.9' - Orange to reddish brown (7.5YR 5/8) medium to
30		7		coarse sand, trace clay.
		16		0.3' - Reddish brown sand, some silt.
		C		Grayish brown sand.
		SS#7		SI: 34-35.0' BLS RE: 0.6'
		22		0.6' - Medium to dark reddish brown (5YR 4/6) medium
		27		to fine sand, trace silt.
35		31		
		C		Reddish brown sand.
		SS#8		SI: 39-40.5' BLS RE: 0.0'
				Attempted split spoon sample, no recovery in sample tube,
40				considered interval to be composed of clean sand.

DRILLING LOG

MW- 18 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
40				
		C		Reddish brown, coarse sand.
		SS#9		SI: 44-45.5' BLS RE: 1.2'
		19		1.2' - Brown to yellowish brown, medium to fine sand.
45		25		Some silt.
		22		
				Driller indicated change in lithology at 46' BLS,
				probably top of the clay layer.
		SS#10		SI: 49-50.5' BLS RE: 1.0'
		2		1.0' - Dark gray (5Y 4/1), finely laminated, dense,
50		4		well compacted clay, silty.
		5		
55				

## WELL CONSTRUCTION SUMMARY

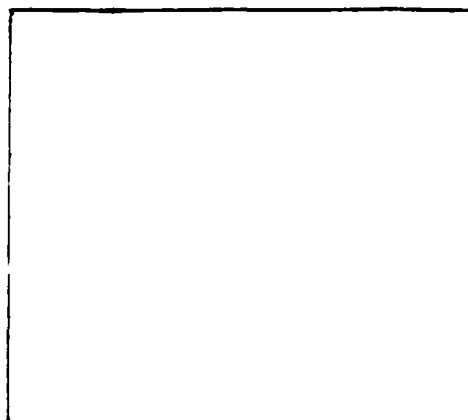
Project: Dover AFB Owner: U.S. Air Force Well No.: MW- 19

	<b>Drilling Summary:</b> Total Depth: <u>44' BLS</u> Drillers: <u>Calvin Wallace</u> Borehole Diameter(s): <u>6 1/2"</u> Delmarva Drilling Rig Type: <u>Failing 1250 Hydraulic Rotary</u> Elevation: Land Surface: <u>14.42'</u> Bit(s): <u>Drag</u> Top of Casing: <u>16.27'</u> Drilling Fluid Type: <u>Water/Bentonite</u> Supervisory Geologist: <u>Andris Lapins</u> Amount Use: _____ Log Book No. <u>1</u> pp. <u>1-17</u> Water Level: <u>7.8' BLS 10/25/84</u>															
	<b>Well Design:</b> Casing: Material: <u>PVC</u> Screen: Material: <u>PVC</u> Diameter: <u>2"</u> ID <u>2 1/4"OD</u> Diameter: <u>2"</u> Length: <u>11'</u> Slot: <u>0.010; 5/inch</u> Filter: Material: <u>4Q sand</u> Setting: <u>9'-44' BLS</u> Setting: <u>7'-44' BLS</u> Seals: Type: <u>Bentonite</u> Grout: Type: <u>#1 Portland Cement/Ben</u> Setting: <u>4.8'-7' BLS</u> Setting: <u>3'-7' BLS</u> Surface Casing: <u>Steel/PVC</u> Other: <u>Protective steel casing cemented in to land surface.</u>															
	<b>Time Log:</b> <table border="1"> <thead> <tr> <th></th> <th>Started</th> <th>Completed</th> </tr> </thead> <tbody> <tr> <td>Drilling:</td> <td><u>10/23/84 1117 hrs.</u></td> <td><u>10/23/84 1827 hrs</u></td> </tr> <tr> <td>Installation:</td> <td><u>10/23/84 1850 hrs</u></td> <td><u>10/24/84 0912 hrs</u></td> </tr> <tr> <td>Water Level Reading:</td> <td></td> <td><u>7.8' BLS 10/25/84</u></td> </tr> <tr> <td>Development:</td> <td></td> <td></td> </tr> </tbody> </table>		Started	Completed	Drilling:	<u>10/23/84 1117 hrs.</u>	<u>10/23/84 1827 hrs</u>	Installation:	<u>10/23/84 1850 hrs</u>	<u>10/24/84 0912 hrs</u>	Water Level Reading:		<u>7.8' BLS 10/25/84</u>	Development:		
		Started	Completed													
Drilling:	<u>10/23/84 1117 hrs.</u>	<u>10/23/84 1827 hrs</u>														
Installation:	<u>10/23/84 1850 hrs</u>	<u>10/24/84 0912 hrs</u>														
Water Level Reading:		<u>7.8' BLS 10/25/84</u>														
Development:																
<b>Well Development:</b> Method/Equipment: <u>Air blown and surged for 2 hours, pumped at 10gpm for 2 hours and until clear.</u>																



**DRILLING LOG**

**Project:** Dover AFB **Owner:** U.S. Air Force **Well No.:** MW - 19



Site Sketch

**Location:** Fire Training **Field Book No.:** 1 pp 1-17  
**Area #3** **Log By:** Andris Lapins  
**Driller:** Calvin Wallace (Delmarva)  
**Rig Type:** Failing 1250 Hydraulic Rotary  
**Reference Point:** Land Surface **Total Depth:** 44' BLS  
**Reference Point Elevation:** 14.42' **Date** 10/23/84 **Time** 1117hrs  
**Drilling Started:** 10/23/84 1117hrs  
**Drilling Completed:** 10/24/84 0912  
**Water Level:** 7.8' 10/25/84 0820  
BLS

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	Legend	DESCRIPTION	Gradation
				SI: Sampling Interval RE: Recovery SS: Split Spoon C: Cuttings		Trace 1-12% Little 12-20% Some 20-30% Add "Y" >30%
0						
		C			Light brown to gray fine to coarse sand, some silt and clay, little gravel; poorly sorted; few rounded subangular quartz pebbles.	
5		SS#1		SI: 5.0-7.0' BLS	RE: 1.0'	
			5		0.6' - Brownish gray fine sand, some silt, trace clay and	
			6		gravel; few sub-angular quartz pebbles.	
			5		0.4' - Gray clay, little fine sand, trace silt; soft; plastic.	
			5			
		C			Gray clay, fine sand, silt. Black clay appears in cuttings at @ 8-9' BLS	
10						

**DRILLING LOG**

MW- 19 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
10		SS#2	3	SI: 10-12' BLS RE: 2.0'
			3	1.7' - Dark black clay - sooty in appearance, trace very
			5	fine sand; much organic matter - dark brown grass
			7	blades and stems.
				0.3' - Gray clay, some medium to coarse sand; some dark brown
				organic matter; small shred of polyethylene plastic;
				reddish yellow mottling.
15		SS#3		SI: 15-17' BLS RE: 1.3'
			17	0.3' - Gray clay, trace very fine sand, few subangular
			15	pebbles; large piece of wood cut by sampler
			8	(@ 0.15' diam.).
			15	0.25' - Pale yellow (5Y7/3) very fine sand, trace clay,
				saturated.
				0.75' - Pale yellow gravelly very fine sand grading to
				gravelly coarse sand, poorly sorted, loose. Gravel
				approx. 0.05' in diameter.
20		SS#4		SI: 20-22' BLS RE: 0.8'
			20	0.8' - Reddish yellow fine to coarse sand, trace silt.
			28	
			53	
			75	
25				

DRILLING LOG

MW - 19 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
25		SS#5	19	SI: 25-27' BLS RE: 0.75'
			63	0.75' - Reddish yellow (7.5YR 6/8) gravelly medium to
			88	Coarse sand; poorly sorted; loose.
			91	
30		SS#6		SI: 30-32' BLS RE: 0.6'
			35	0.6' - Yellow (10YR 7/8) fine sand.
			45	
			150	
			100(3')	
35		SS#7		SI: 35-37' BLS RE: 0.5'
			18	0.5' - Yellow (2.5Y 7/6) fine sand.
			30	
			42	
			90	
40				



**WELL CONSTRUCTION SUMMARY**

Project: Dover AFB Owner: U.S. Air Force Well No.: MW- 20

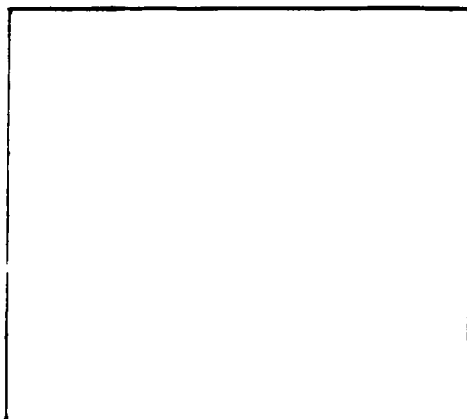
	<b>Drilling Summary:</b> Total Depth: <u>40' BLS</u> Drillers: <u>Calvin Wallace</u> Borehole Diameter(s): <u>6 1/2"</u> <u>Delmarva Drilling</u> Rig Type: <u>Failing 1250 Hydraulic Rotary</u> Elevation: Land Surface: <u>10.39'</u> Bit(s): <u>Drag</u> Top of Casing: <u>12.34'</u> Drilling Fluid Type: <u>Water/Bentonite</u> Supervisory Geologist: <u>Andris Lapins</u> Amount Use: _____ Log Book No. <u>1</u> pp. <u>17-31</u> Water Level: <u>4.15' BLS</u> <u>1/9/85</u>															
	<b>Well Design:</b> Casing: Material: <u>PVC</u> Screen: Material: <u>PVC</u> Diameter: <u>2"</u> ID <u>2 1/4"OD</u> Diameter: <u>2"</u> Length: <u>9'</u> Slot: <u>0.010; 5/16 inch</u> Filter: Material: <u>4Q Sand</u> Setting: <u>7'-40' BLS</u> Setting: <u>4.8'-40 BLS</u> Seals: Type: <u>Bentonite</u> Grout: Type: <u>#1 Portland Cement/Ben</u> Setting: <u>2.5'-4.8' BLS</u> Setting: _____ Surface Casing: <u>Steel/PVC</u> Other: <u>Protective steel casing cemented in to land surface.</u>															
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Time Log:</th> <th style="text-align: left;">Started</th> <th style="text-align: left;">Completed</th> </tr> </thead> <tbody> <tr> <td>Drilling:</td> <td><u>10/24/84 1253 hrs</u></td> <td><u>10/24/84 1628 hrs</u></td> </tr> <tr> <td>Installation:</td> <td><u>10/25/84 0934 hrs</u></td> <td><u>10/25/84 1044 hrs</u></td> </tr> <tr> <td>Water Level Reading:</td> <td></td> <td><u>1/9/85 4.15' BLS</u></td> </tr> <tr> <td>Development:</td> <td></td> <td></td> </tr> </tbody> </table>	Time Log:	Started	Completed	Drilling:	<u>10/24/84 1253 hrs</u>	<u>10/24/84 1628 hrs</u>	Installation:	<u>10/25/84 0934 hrs</u>	<u>10/25/84 1044 hrs</u>	Water Level Reading:		<u>1/9/85 4.15' BLS</u>	Development:		
	Time Log:	Started	Completed													
Drilling:	<u>10/24/84 1253 hrs</u>	<u>10/24/84 1628 hrs</u>														
Installation:	<u>10/25/84 0934 hrs</u>	<u>10/25/84 1044 hrs</u>														
Water Level Reading:		<u>1/9/85 4.15' BLS</u>														
Development:																
<b>Well Development:</b> Method/Equipment: <u>Air Lift for 8 hours, on and off for</u> <u>for minimum 2 hour and until clear.</u>																

**DRILLING LOG**

Project: Dover AFB

Owner: U.S. Air Force

Well No.: MW - 20



Site Sketch

Location: Fire Training Field Book No.: 1 pp 17-31  
Area #3 Log By: Andris Lapins  
Driller: Calvin Wallace (Delmarva)  
Rig Type: Failing 1250 Hydraulic Rotary  
Reference Point: Land Surface Total Depth: 40' BLS  
Reference Point Elevation: 10.39' Date Time  
Drilling Started: 10/24/84 1253  
Drilling Completed: 10/25/84 1044  
Water Level: 4.15' BLS 1/9/85

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	Legend	DESCRIPTION	Gradation
				SI: Sampling Interval RE: Recovery SS: Split Spoon C: Cuttings		Trace 1-12% Little 12-20% Some 20-30% Add "Y" >30%
0						
		C			Silty fine sand and black clay.	
5		SS#1		SI: 5-7' BLS		RE: 1.5'
		6			0.5' - Gray to olive grav clay, some medium sand, little	
		10			fine gravel; reddish brown mottling; soft to firm.	
		18			0.5' - Medium to coarse gray sand; yellow to reddish brown	
		14			mottling.	
					0.5' - Gray clay, some medium sand, little gravel; reddish	
					brown mottling; soft to firm.	
10						

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
10		SS#2	12	SI: 10-12' BLS RE: 1.41'
			37	0.2' - Gray clay; yellowish brown mottling.
			94	0.1' - Dark brown organic layer with wood chips.
			92	0.5' - Gray Medium to coarse sand; black organic rich laminations; few large pebbles.
				0.6' - Yellow to buff medium sand grading to gray medium sand and gravel; gravel mixed, poorly sorted.
15		SS#3		SI: 15-17' BLS RE: 0.8'
			13	0.8' - Yellow (10YR 7/6) fine to medium sand, trace silt.
			13	
			15	
			17	
20		SS#4		SI: 20-22' BLS RE: 0.8'
			9	0.2' - Brownish yellow (10YR 6/8) fine sand, trace silt.
			12	0.25' - Brownish yellow (10YR 6/6) clay, trace sand.
			13	0.35' - Brownish yellow medium sand and gravel, trace silt.
			36	
25				

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
25		SS#5	9	SI: 25-27' BLS RE: 0.6'
			8	0.6' - Brownish yellow fine to medium sand, little light
			16	gravel, trace silt.
			22	
		SS#6		SI: 30-32' BLS RE: None
			17	Second attempt for sample at this depth results in 4 inches
			23	of penetration after more than 200 blows with no recovery.
			23	Much heavy gravel accumulated in bottom of hole. Hole
			40	advanced to 31' BLS and flushed heavily. Third attempt for
				sample resulted in no recovery. Cuttings: Brownish yellow
				coarse sand, little gravel.
		SS#7		SI: 35-37' BLS RE: 0.8'
			11	0.8' - Yellowish red (5YR 5/8) fine to coarse sand, little
			17	gravel, trace silt; poorly sorted. Large iron
			25	concretion in cave material at top of sample.
			32	
				Rig shimmy at @ 38-39' BLS from iron concretions or heavy
				gravel.
40				



## DRILLING LOG

MW - 20 cont.

40

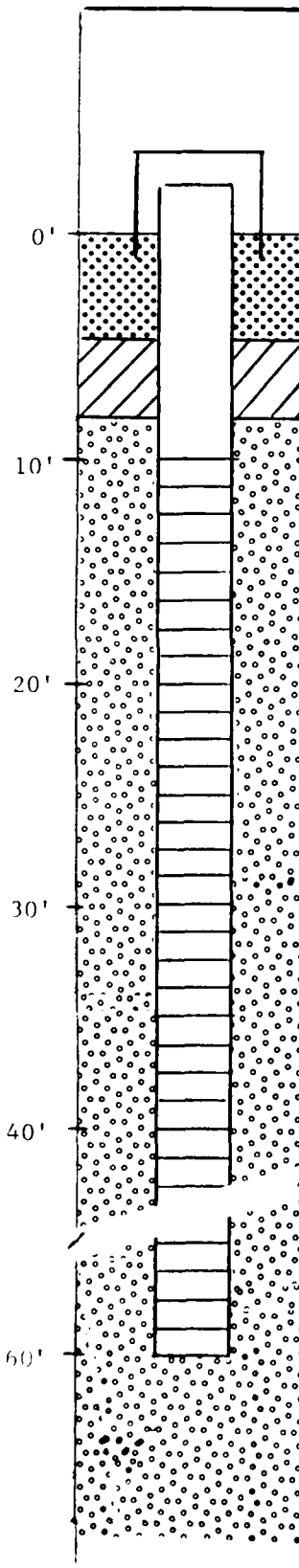
45

50

55

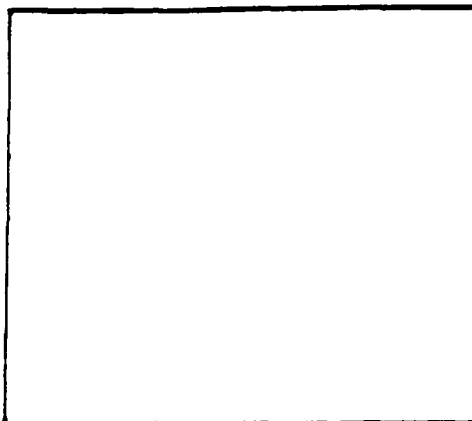
**WELL CONSTRUCTION SUMMARY**

Project: Dover AFB Owner: U.S. Air Force Well No.: MW- 21

	<b>Drilling Summary:</b> Total Depth: <u>Drilled to 66.5' BLS</u> Drillers: <u>Gary Truver</u> Borehole Diameter(s): <u>6.5"</u> <u>Delamarva Drilling</u> Rig Type: <u>Failing 1250 Hydraulic Rotary</u> Elevation: Land Surface: _____ Bit(s): <u>Drag</u> Top of Casing: <u>18.03'</u> Drilling Fluid Type: <u>Water/Bentonite</u> Supervisory Geologist: <u>Ed Tokarski</u> Amount Use: _____ Log Book No. <u>2</u> pp. <u>1-5</u> Water Level: <u>8.73' BLS 11/19/84; 1400</u>															
	<b>Well Design:</b> Casing: Material: <u>PVC</u> Screen: Material: <u>PVC</u> Diameter: <u>2.0"</u> ID <u>2.25"</u> OD Diameter: <u>2"</u> Length: <u>12'</u> Slot: <u>0.01 10 Slot/Inch</u> Filter: Material: <u>4Q sand</u> Setting: <u>10' - 60'</u> Setting: <u>8.16' - 67'</u> Seals: Type: <u>Bentonite Pellets</u> Grout: Type: <u>#1 Portland Cement/Ben</u> Setting: <u>5.66' - 8.16'</u> Setting: <u>2.0' - 8.16'</u> Surface Casing: <u>Steel/PVC</u> Other: <u>Protective steel casing cemented into land surface.</u>															
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Time Log:</th> <th style="width: 35%;">Started</th> <th style="width: 35%;">Completed</th> </tr> </thead> <tbody> <tr> <td>Drilling:</td> <td><u>10/29/84 0930</u></td> <td><u>10/29/84 1430</u></td> </tr> <tr> <td>Installation:</td> <td><u>10/29/84 1430</u></td> <td><u>10/29/84 1600</u></td> </tr> <tr> <td>Water Level Reading:</td> <td colspan="2"><u>8.73' BLS 11/19/84 1400</u></td> </tr> <tr> <td>Development:</td> <td>_____</td> <td>_____</td> </tr> </tbody> </table>	Time Log:	Started	Completed	Drilling:	<u>10/29/84 0930</u>	<u>10/29/84 1430</u>	Installation:	<u>10/29/84 1430</u>	<u>10/29/84 1600</u>	Water Level Reading:	<u>8.73' BLS 11/19/84 1400</u>		Development:	_____	_____
	Time Log:	Started	Completed													
Drilling:	<u>10/29/84 0930</u>	<u>10/29/84 1430</u>														
Installation:	<u>10/29/84 1430</u>	<u>10/29/84 1600</u>														
Water Level Reading:	<u>8.73' BLS 11/19/84 1400</u>															
Development:	_____	_____														
<b>Well Development:</b> Method/Equipment: <u>Air blown for 8 hours, pumped at 10gpm</u> <u>for minimum 2 hours and until clear.</u>																

**DRILLING LOG**

**Project:** Dover AFB **Owner:** US Air Force **Well No.:** MW- 21



Site Sketch

**Location:** Downgradient **Field Book No.:** 2 pp 1-5  
**App.** 20 ft. East **Log By:** Ed Tokarski  
**Site** #D-5 **Driller:** Calvin Wallace (Delmarva)  
**Rig Type:** Failing 1250 Hydraulic  
**Reference** **Total** **Rotary**  
**Point:** Land Surface **Depth:** Drilled to 65' BLS  
**Reference** **Well to 60' BLS**  
**Point** **Date** **Time**  
**Elevation:**                      **Drilling Started:** 10/29/84 0930  
**Drilling Completed:** 10/29/84 1600  
**Water Level:** 11/19/84 1400  
8.73' BLS

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	LEGEND	DESCRIPTION	GRADATION
				SI = Sample Interval RE = Recovery SS = Split Spoon C = Cuttings		Trace = 1-12% Little = 12-20% Some = 20-30%
0'						
2'						
4'						
6'		SS#1	6	SI: 5.0 - 7.0' BLS		RE: 1.25'
			11	0.0' - 0.25'	Brown sand with some gravel.	
			19	0.25' - 0.42'	Gray silty clay with trace sand.	
			21	0.42' - 1.68'	Light gray sand with brown streaks trace silt and few pebbles.	
8'				1.08' - 1.25'	Dark gray clay with some silt.	
10'						

**DRILLING LOG**

MW- 21 cont.

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	DESCRIPTION
10'				SI: 10.0' - 12.0' BLS RE: 0.9'
		SS#2	17	0.0' - 0.2' Dark gray clay with some silt- few pebbles.
			21	1.2' - 0.9' Light gray medium sand - some silt.
			39	
			33	
12'				
14'				
				SI: 15.0' - 17.0' BLS RE: 1.33'
		SS#3	4	0.0' - 0.2' Gray clay with some pebbles (heave)
16'			6	0.2' - 1.33' Light gray medium to fine sand with trace
			11	silt.
			10	*NOTE: Oil sheen on wash water while cleaning SS#3 from 15' from 15' to 17' BLS.
18'				
20'				SI: 20.0' - 22.0' RE: 2.0'
		SS#4	6	0.0' - 0.1' Gray clay with pebbles.
			7	0.1' - 2.0' Light gray coarse to fine sand with small black
			8	angular fragments. (Less than 2 cm diameter).
			8	
22'				
24'				
				SI: 25.0' - 27.0' RE: 1.0'
		SS#5	11	0.0' - 1.0' Light gray coarse to medium sand.
			8	
26'				

**DRILLING LOG**

MW- 21 cont.

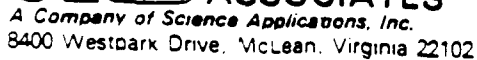
Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	DESCRIPTION
26'		SS#5	10	
		(cont.)	11	
28'				
30'				SI: 30.0' - 32.0' BLS RE: No recovery
		SS#6	12	
			17	No recovery. Cuttings indicate still in medium sand.
			17	
			19	
32'				
34'				
				SI: 35.0' - 37.0' BLS RE: 1.0'
			10	0.0' - 0.5' Light gray medium to fine sand.
36'		SS#7	12	0.5' - 1.0' Light gray coarse sand with angular and rounded
			9	fragments (diameter less than 2 cm.)
			10	
38'				
				SI: 40.0' - 42.0' BLS RE: 0.0'
40'			12	All wash - poorly sorted (.1 cm to 3 cm).
		SS#8	17	Pebbles - green, black, pink, brown, white
			20	No recovery - cuttings indicate still in sand.
			25	
42'				

Page 4 of 5

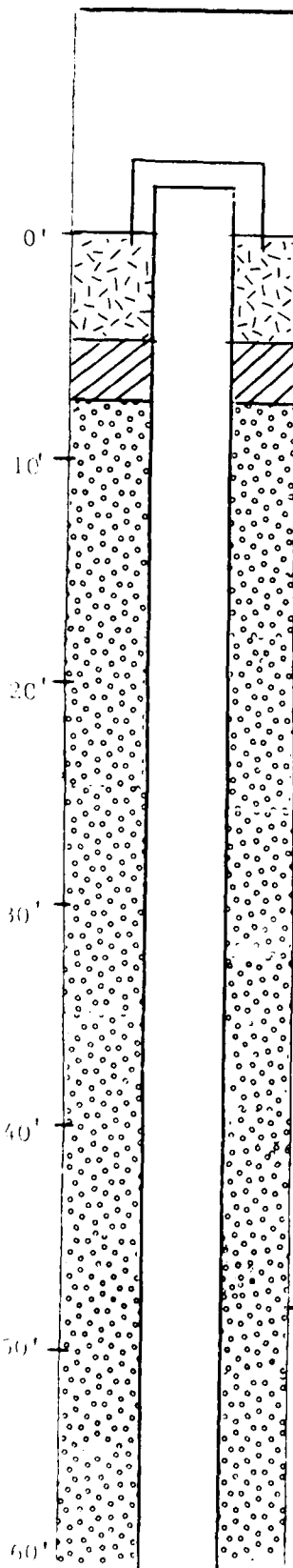
**DRILLING LOG**

MW- 21 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
58'				
60'				
			10	SI: 60.0' - 62.0' BLS RE: 1.2'
		SS#12	10	0.0' - 1.2' Reddish brown clay (almost rust color).
			15	
62'			25	
64'				
				SI: 65.0' - 66.5' BLS RE: 1.5'
			30	0.0' - 1.5' Dark black clay-dry.
66'		SS#13	39	
			69	
68'				
70'				
72'				
74'				



Project: Dover AFB Owner: U.S. Air Force Well No.: MW-22



Total Depth: Drilled to 62' BLS Drillers: Calvin Wallace  
Borehole Diameter(s): 8" Calvin Wallace (Delmarva)  
 Rig Type: Failing 1250 Hydraulic Rotary  
Elevation: Land Surface:  Bit(s): Drag  
Top of Casing: 20.19' Drilling Fluid Type: Water/Bentonite  
Supervisory Geologist: Ed Tokarski Amount Use:   
Log Book No. 2 pp. 7-10 Water Level: 8.78' 11/19/84. 1410

Casing: Material: PVC Screen: Material: PVC  
Diameter: 2" ID 2 1/4" OD Diameter: 2"  
Length: 12' Slot: .010; 5/in  
Filter: Material: 4Q Sand Setting: 10. to 60' BLS  
Setting: 8-60' BLS Seals: Type: Bentonite Pellets  
Grout: Type: #1 Portland Cement Setting: 5.8 - 8.0' BLS  
Setting: LS-5.8' BLS Surface Casing: Steel/PVC  
Other:

Drilling:	10/30/84	0800	10/30/84	1200
Installation:	10/30/84	1325	10/30/84	1430
Water Level Reading:		10' BLS	10/30/84	1330
Development:				

Method/Equipment: Air blown for 8 hours, pumped at 10 gpm  
for minimum 2 hours and until clear.

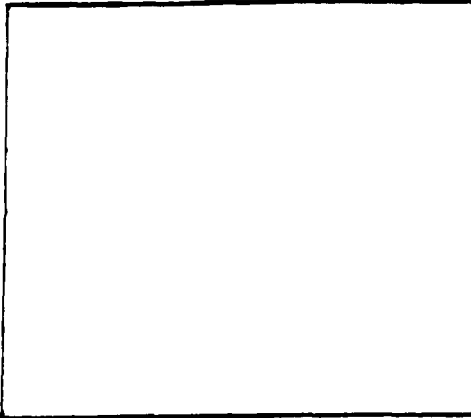


## DRILLING LOG

Project: Dover AFB

Owner: US Air Force

Well No.: WW- 22



Site Sketch

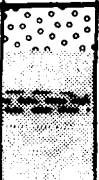



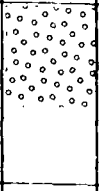

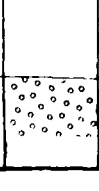
Location: Downgradient Field Book No.: 2 pp 7-10  
app. 20 ft Ne Site Log By: Ed Tokarski  
D-5 Driller: Calvin Wallace - Delmarva  
 Rig Type: Failing 1250 Hydraulic  
 Total Rotary  
 Reference Point: Land Surface Depth: Drilled to 62.0' BLS  
well to 60' BLS.  
 Reference Point Date Time  
 Elevation:                      Drilling Started: 10/30/84 0800  
 Drilling Completed: 10/30/84 1200  
 Water Level: 8.78, 11/19/84

1410

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	DESCRIPTION
0'				
1'				
2'				
3'				
4'				
5'				
6'				
7'				
8'				
9'				
10'				




**DRILLING LOG**

MW- 22 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
10'		SS#2	16	SI: 10.0' - 12.0' BLS RE 2.0'
			24	0.0' - 0.55' Light gray coarse sand with pebbles.
			27	0.55' - 1.5' Black clay with some organic matter; some
12'			35	silt.
				1.5 - 2.0' Light gray clay.
14'		SS#3	16	SI: 15.0 - 17.0' BLS RE: 1.15'
			24	0.0' - 0.2' Black clay with trace organic matter.
16'			27	0.2' - 1.15' Light gray to white, medium to fine sand,
			35	trace gravel.
				
18'		SS#4		SI: 20.0' - 22.0' BLS RE: 1.15'
			17	0.0' - 0.4' Light gray to white medium sand.
20'			12	0.4' - 1.15' Light gray to white medium to fine sand.
			14	
		SS#5	20	
22'				SI: 25.0' - 27.0' BLS RE: 0.75'
				0.0' - 0.75' Light gray to white fine sand.
			15	
24'			17	
26'				



**DRILLING LOG**

NW- 22 cont.

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (bl)	DESCRIPTION
26'		SS#5	17	
		cont.	23	
28'				
30'				SI: 30.0' - 32.0' BLS RE: 0.7'
		SS#6	11	0.0' - 0.7' Light gray to white firm sand, trace gravel.
			15	
			14	
			15	
32'				
34'				
				SI: 35.0' - 37.0' BLS RE: 0.75'
		SS#7	10	0.0' - 0.75' Light gray coarse to fine sand.
36'			12	
			11	
			15	
38'				
				SI: 40.0' - 42.0' BLS RE: 0.75'
40'		SS#8	10	0.0' - 0.75' Poorly sorted, light gray coarse to fine sand
			16	with some gravel.
			19	
			27	
42'				

**DRILLING LOG**

MW- 22 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
42'				
44'				
				SI: 45.0' - 47.0' BLS RE: 0.5'
46'		SS#9	12	0.0' - 0.5' Light gray to white coarse sand, with brown-
			13	red streaking.
			14	
			21	
48'				
50'				SI: 50.0' - 52.0' BLS RE: 0.0'
			10	No recovery - cuttings indicate still in same formation
		SS#10	13	
			24	
52'			23	
54'				
			25	SI: 55.0' - 57.0' BLS RE: 0.45'
56'			21	0.0' - 0.45' - Tan fine sand.
			27	
			35	
58'				

DRILLING LOG

MS-12 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
58'				
60'				SI: 60.0' - 62.0' BLS RE: 1.0'
		SS#12	5	0.0' - 0.5' Brownish-red clay.
			8	0.5' - 1.0' Light olive brown clay with gray laminations.
			12	(Light olive brown = 2.5Y 5/5/6)
62'			19	
64'				
66'				
68'				
70'				
72'				
74'				

# JRB ASSOCIATES

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## WELL CONSTRUCTION SUMMARY

Project: Dover AFB

Owner: U.S. Air Force

Well No.: MW-23

### Drilling Summary:

Total Depth: 57' BLS Drillers: Gary Truver  
Borehole Diameter(s): 6" Walton Drilling  
Rig Type: CME-55 : Auger  
Elevation: Land Surface: 19.44' Bit(s): Auger  
Top of Casing: 21.39' Drilling Fluid Type: Water  
Supervisory Geologist: Andris Lapins Amount Use:             
Log Book No. 1 pp. 55-69 Water Level: 10.5' BLS 1/9/85

### Well Design:

Casing: Material: PVC Screen: Material: PVC  
Diameter: 2" ID 2 1/4" OD Diameter: 2"  
Length: 12' Slot: 0.010; 5/inch  
Filter: Material: Formation/4Q Sand Setting: 10'-57' BLS  
Setting: 19.5'-57' BLS/8'-19.5' BLS Seals: Type: Bentonite  
Grout: Type: #1 Portland Cement/Ben Setting: 6'-8' BLS  
Setting: 2.5'-6' BLS Surface Casing: Steel/PVC  
Other: Protective steel casing cemented in to land surface.

### Time Log:

#### Started

#### Completed

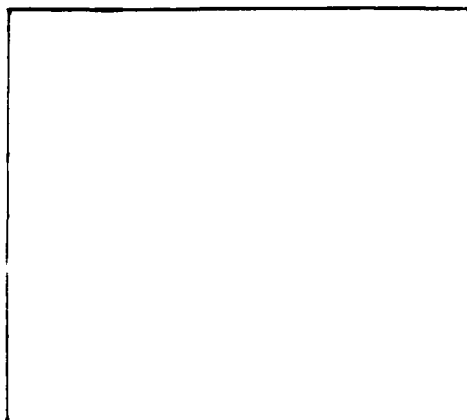
Drilling:	<u>10/29/84</u>	<u>1545 hrs</u>	<u>10/30/84</u>	<u>1012 hrs</u>
Installation:	<u>10/30/84</u>	<u>1040 hrs</u>	<u>10/30/84</u>	<u>1240 hrs</u>
Water Level Reading:			<u>1/9/85</u>	<u>10.5' BLS</u>
Development :				

### Well Development:

Method/Equipment: Air blown for 8 hours, pumped twice at  
10 gpm for 2 hours and until clear

**DRILLING LOG**

**Project:** Dover AFB **Owner:** U.S. Air Force **Well No.:** MW-23



Site Sketch

**Location:** \_\_\_\_\_ **Field Book No.:** 1 pp 55-69  
Site D-4 **Log By:** Andris Lapins  
**Driller:** Garv Turver (Walton)  
**Rig Type:** CME-55 / Auger

**Reference** **Total**  
**Point:** Land Surface **Depth:** 57' BLS

**Reference** **Date** **Time**  
**Point**  
**Elevation:** 19.44' **Drilling Started:** 10/29/84 1545  
**Drilling Completed:** 10/30/84 1240  
**Water Level:** 10.5' BLS 1/9/85

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	Legend	DESCRIPTION	Gradation
				SI: Sampling Interval RE: Recovery SS: Split Spoon C: Cuttings		Trace 1-12% Little 12-20% Some 20-30% Add "Y" >30%
0						
		SS#1		SI: 4-6' BLS		RE: 1.8'
			4		1.8' - Light olive grav (5Y 6/2) silt, some very fine	
			5		sand and clay; brown mottling; damp; friable.	
5			5			
			6			
		SS#2		SI: 9-11' BLS		RE: 1.75'
			9		0.45' - Same as above	
10			9		1.3' - Gray (5Y 6/1) fine to medium sand, little gravel	

**DRILLING LOG**

MW-23 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
10		SS#2	14	trace silt and clay grading to yellowish brown
			16	(10YR 5/6) fine sand some silt, trace clay; wet.
		SS#3		SI: 14-16' BLS RE: 2.0'
			2	0.1' - Yellowish brown (106YR 7/6) fine to medium sand,
			2	some silt, trace clay; loose; wet.
15			3	1.55' - Black (7.5R 2.5/0) clay, trace very fine sand and
			15	silt; trace organic matter; firm; medium dense; damp.
				0.35' - Gray (5Y 6/1) fine sand, trace clay; loose; wet.
		SS#4		SI: 19'-21' BLS RE: 1.0'
			5	1.0' - Gray (5Y 6/1) medium sand, little light gravel, trace
			7	clay; loose; wet.
20			10	
			11	
		SS#5		SI: 24-26' BLS RE: 1.5'
			5	1.5' - Same as above
			7	
25				



Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
25		SS#5	7	
			10	
		SS#6		SI: 29-31' BLS RE: 1.0'
			4	0.65' - White to light gray (5Y 8/1) fine sand, some silt,
30			8	loose, wet.
			13	0.35' - Light gray medium to coarse sand, some gravel;
			16	poorly sorted; loose; wet.
		SS#7		SI: 34-36' BLS RE: 0.5'
			7	0.5' - White (5Y 8/1) fine sand, trace light gravel;
			10	loose; wet.
35			14	
			16	
		SS#8		SI: 39-41' BLS RE: 1.0'
			6	1.0' - Same as above
40			5	

**DRILLING LOG**

MW-23 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
40		SS#8	7	
			10	
		SS#9		SI: 44-46' BLS RE: 1.3'
			8	0.5' - Same as above
45			6	0.8' - White to light gray (5Y 7/2) sand and gravel,
			12	some clay; few rounded pebbles; poorly sorted;
			17	loose; wet.
		SS#10		SI: 49-51' BLS RE: 0.7'
			9	0.4' - Pale yellow (5Y 8/4) medium sand and gravel, trace
			12	silt; poorly sorted; loose; wet.
50			12	0.3' - Yellowish brown (10YR 5/8) fine to medium sand, some
			15	silt; little gravel, few large pebbles; poorly sorted
				loose, wet.
		SS#11		SI: 54-56' BLS RE: 0.85'
			14	0.2' - Brownish yellow (10YR 6/8) medium sand, trace silt;
			35	loose; wet.
55			73	0.15' - Very pale brown (10YR 8/4) fine sand; loose; wet.

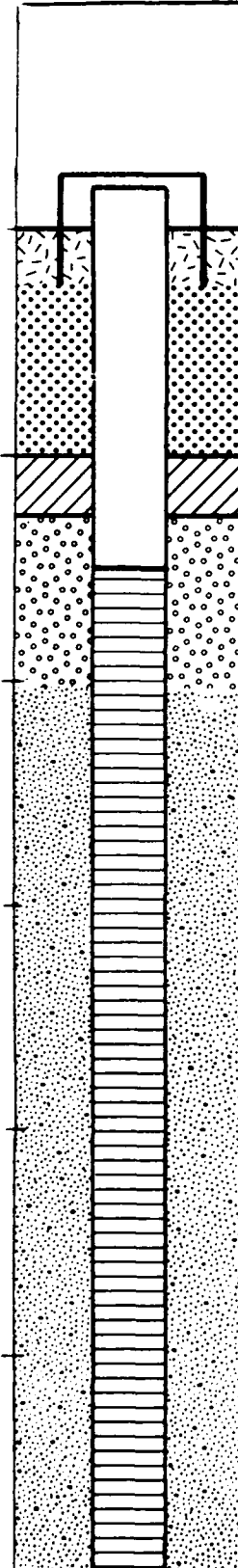


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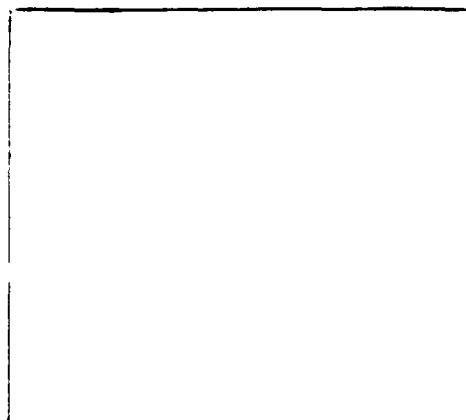
## WELL CONSTRUCTION SUMMARY

Project: Dover AFB Owner: U.S. Air Force Well No.: MW-24

0'		<b>Drilling Summary:</b>			
		Total Depth: <u>60' BLS</u>		Drillers: <u>Gary Truver</u>	
		Borehole Diameter(s): <u>6"</u>		Walton Drilling	
		Rig Type: <u>CME-55 : Auger</u>			
10'		Elevation: Land Surface: <u>23.68'</u>		Bit(s): <u>Auger</u>	
		Top of Casing: <u>25.61'</u>		Drilling Fluid Type: <u>Water</u>	
		Supervisory Geologist: <u>Andris Lapins</u>		Amount Use: <u></u>	
		Log Book No. <u>1</u> pp. <u>70-84</u>		Water Level: <u>14.75' BLS 10/31/84</u> <u>15.06' BLS 1/9/85</u>	
20'		<b>Well Design:</b>			
		Casing: Material: <u>PVC</u>		Screen: Material: <u>PVC</u>	
		Diameter: <u>2"</u> ID <u>2 1/4"</u> OD Diameter: <u>2"</u>			
		Length: <u>17"</u>		Slot: <u>0.010; 5/16"</u>	
30'		Filter: Material: <u>Formation/4Q Sand</u>		Setting: <u>15'-60' BLS</u>	
		Setting: <u>20.5-60' BLS/12.5-20.5' BLS</u>		Seals: Type: <u>Bentonite</u>	
		Grout: Type: <u>#1 Portland Cement/Ben</u>		Setting: <u>10'-12.5' BLS</u>	
		Setting: <u>2'-10' BLS</u>		Surface Casing: <u>Steel/PVC</u>	
40'		Other: <u>Protective steel casing cemented in to land surface.</u>			
50'		<b>Time Log:</b>			
		Started		Completed	
		Drilling: <u>10/30/84 1420 hrs</u>		<u>10/31/84 0837 hrs</u>	
		Installation: <u>10/31/84 0919 hrs</u>		<u>10/31/84 1150 hrs</u>	
60'		Water Level Reading: <u>14.75' BLS 10/31/84</u>		<u>1/9/85 15.06' BLS</u>	
		Development : <u></u>			
		<b>Well Development:</b>			
		Method/Equipment: <u>Air blown for 8 hours, pumped twice at</u> <u>10 gpm for 2 hours and until clear</u>			

## DRILLING LOG

Project: Dover AFB Owner: U.S. Air Force Well No.: MW-24



Site Sketch

Location: \_\_\_\_\_ Field Book No.: 1 pp 70-84

Site S-1 Log By: Andris Lapins

Driller: Gary Truver (Walton)

Rig Type: CME-55 : Auger

Reference

Total

Point: Land Surface

Depth: 60' BLS

Reference

Date Time

Point

Elevation: 23.68'

Drilling Started: 10/30/84 1420hr

Drilling Completed: 10/31/84 1150



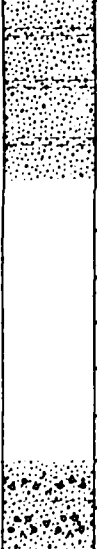

Water Level: 14.75' BLS 10/31/84

15.06' BLS 9/1/85

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	Legend	DESCRIPTION	Gradation
				SI: Sampling Interval RE: Recovery SS: Split Spoon C: Cuttings		Trace 1-12% Little 12-20% Some 20-30% Add "Y" 30%
0						
		SS#1		SI: 4-6' BLS	RE: 1.7'	
			2	1.7' -	Light yellowish brown (2.5Y 6/4) silt, trace very	
			3		fine sand with strong brown (7.5YR 5/8) silt	
5			4		laminations (0.05 to 0.2' in thickness); moist.	
			4			
		SS#2		SI: 9-11' BLS	RE: 1.9'	
			5	0.3' -	Yellowish brown (10YR 5/8) silt, some clay; moist.	
10			6			

**DRILLING LOG**

MW: 14 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
10		SS#2	9	0.4' - Grayish brown (2.5Y 5/2) clay, some silt and sand,
			9	little gravel, few rounded quartz pebbles.
				0.1' - Yellowish red (5YR 5/8) clay, some silt and sand;
				little gravel.
				0.1' - Black (5YR 2.5/1) sand, silt, and clay.
				1.0' - Pale yellow (2.5Y 7/4) fine to coarse sand and gravel,
				few rounded pebbles; poorly sorted; medium dense; damp.
		SS#3		SI: 14-16' BLS RE: 1.8'
			1	1.8' - Light gray fine sand, some silt, little gravel;
			4	loose to medium dense; saturated.
15			4	
			7	
		SS#4		SI: 19-21' BLS RE: 1.9'
			1	Light gray (2.5Y 7/0) fine sand, some silt, trace clay;
20			1	saturated.
			2	
			5	Static water level in Auger @ 15.7' BLS.
		SS#5		SI: 24-26' BLS RE: 1.4'
			2	1.4' - White to light gray (5Y 8/2-7/2) medium to coarse sand,
25			4	some gravel, trace silt; loose; saturated.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
25		SS#5	7	
			5	
		SS#6		SI: 29-31' BLS RE: 0.4'
			9	0.4' - Same as above
30			9	
			8	
			7	
		SS#7		SI: 34-36' BLS RE: 1.3'
			5	1.3' - Pale yellow fine to medium sand, some gravel,
35			6	trace silt; poorly sorted; loose; saturated.
			7	
			8	
		SS#8		SI: 39-41' BLS RE: 0.8'
			2	Pale yellow (2.57 8/4 to 7.4) medium to coarse sand,
40			3	some gravel, trace silt; loose; saturated.

**DRILLING LOG**

MW-24 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
40		SS#8	5	
			7	
		SS#9		SI: 44-46' BLS RE: 0.8'
			8	0.6' - Pale yellow (5Y 7/4) fine sand, trace silt and
45			9	gravel; loose; saturated.
			12	0.2' - Brownish yellow medium to coarse sand and gravel,
			12	trace silt; loose; saturated.
		SS#10		SI: 49-51' BLS RE: 0.7'
			7	0.7' - Pale yellow fine to medium sand, trace silt and
50			5	gravel; emerald green spots-mineral; loose;
			8	saturated.
			14	
		SS#11		SI: 54-56' BLS RE: None
			7	Two sample attempts - no recovery.
55			7	Drilling continued cautiously.



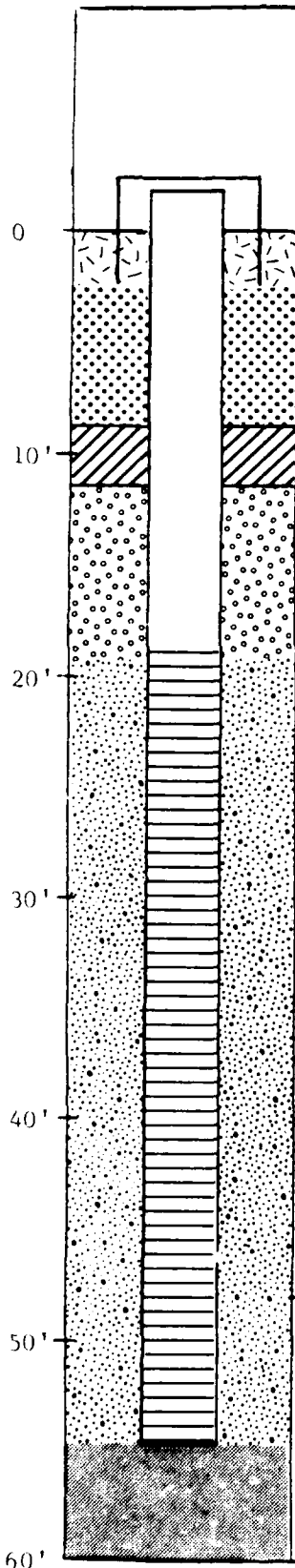
DRILLING LOG

MW-24 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
55		SS#11	11 7	
			13 11	
		SS#12		SI: 59-61' BLS RE: 0.3'
			7	0.3' - Brownish yellow (10YR 6/8) medium to coarse sand,
60			11	trace silt and gravel; poorly sorted; loose; wet.
			14	
			19	
				Driller reports entering clay layer at @ 61.5' BLS.
		SS#13		SI: 64-66' BLS RE: 1.0'
			6	1.0' - Very dark gray silty clay, trace very fine sand;
65			12	light gray very fine sand and silt laminations;
			14	dense; firm.
			15	
70				

**WELL CONSTRUCTION SUMMARY**

Project: Dover AFB Owner: U.S. Air Force Well No.: MW-25



**Drilling Summary:**

Total Depth: 55' Drillers: Gary Truver  
Borehole Diameter(s): 6" Walton Corporation  
Rig Type: CME Auger  
Elevation: Land Surface: 24.52' Bit(s): Hollow stem auger  
Top of Casing: 26.82' Drilling Fluid Type: None  
Supervisory Geologist: Richard Eades Amount Use:   
Log Book No. 5 pp. 27-35 Water Level: 18.7' 11/8/84

**Well Design:**

Casing: Material: Schedule 40 PVC Screen: Material: Schedule 40 PVC  
Diameter: 2" ID 2 3/8" OD Diameter: 2"  
Length: 20' Slot: 0.010; 5 slots/inch  
Filter: Material: 4Q Sand Setting: 18'-55'  
Setting: 16'-19' Seals: Type: Bentonite  
Grout: Type: #1 Portland Cement/Ben Setting: 9'-11'  
Setting: LS-9.0' Surface Casing: Steel/PVC  
Other: Formation allowed to cave, providing no oral sand pack from  
19.0 - 55.0' . Protective steel casing cemented into  
land surface.

**Time Log:**

**Started**

**Completed**

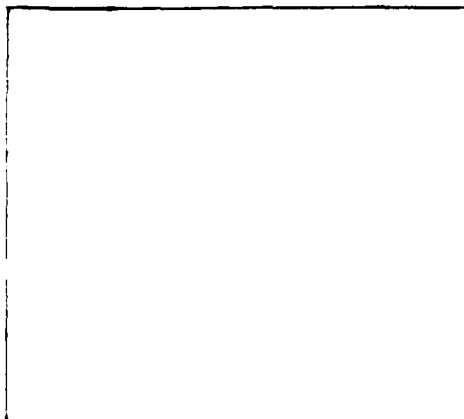
	Started	Completed
Drilling:	<u>11/7/84 1540 hrs</u>	<u>11/8/84 1050 hrs</u>
Installation:	<u>11/8/84 1059 hrs</u>	<u>11/8/84 1130 hrs</u>
Water Level Reading:	<u></u>	<u>11/8/84 0820 hrs</u>
Development :	<u></u>	<u></u>

**Well Development:**

Method/Equipment: Air blown for 8 hours, pumped twice at  
10 pgm for minimum 2 hours and until clear.

**DRILLING LOG**

Project: Dover AFB Owner: U.S. Air Force Well No.: MW-25



Site Sketch

Location: Hazardous Field Book No.: 5 pp 27-35  
Waste Storage Area Log By: Rick Eades  
Driller: Gary Truver  
Rig Type: CME Auger  
Reference Point: Land Surface Total Depth: 55'

Reference Point Elevation: \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
Drilling Started: 11/7/84 1540hrs  
Drilling Completed: 11/8/84 1050  
Water Level: 18.7' 11/8/84 0820

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	Legend	DESCRIPTION	Gradation
				SI: Sampling Interval RE: Recovery SS: Split Spoon C: Cuttings		Trace 1-12" Little 12-20" Some 20-30" Add "Y" 30"
0						
		C			Medium to dark brown silt, some clay.	
		C			Dark yellowish brown clay.	
		SS#1		SI: 4-6' BLS		RE: 2.0'
			3		0.7' - Orangish brown (10YR 6/8) clay, some silt.	
			6		1.3' - Grayish brown (10YR 5/2) silt, some clay.	
			9			
			7			
		C			Orange brown to gray brown silt and clay interbedded.	
		SS#2		SI: 9-11' BLS		RE: 1.9'
			2		1.1' - Gray (10YR 7/2) clay with thin interbeds of	
10			3		orangish brown silt.	

**DRILLING LOG**

MW- 25 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
10		SS#2	8	0.8' - Various colored (orange, brown, dark gray,
			6	black) coarse sand.
		C		Brown clay, some silt.
		SS#3		SI: 14'16' BLS RE: 1.5'
			5	0.3' - Brownish gray (10YR 5/2) clay.
15			7	1.2' - Light gray (7.5YR 7/1) coarse to medium sand,
			5	some quartz pebbles and cobbles up to 1.0" in
			9	diameter.
		C		Light gray, coarse to medium sand.
		SS#4		SI: 19-21' BLS RE: 1.9'
			2	1.9' - Light gray (5YR 7/1) to white, coarse to fine
20			2	sand, some pebbles, wet.
			1	
			3	
		C		Light gray sand, very wet.
		SS#5		SI: 24-26' BLS RE: 1.1'
			4	1.1' - Light gray (5YR 7/1) coarse to medium sand.
25			4	

**DRILLING LOG**

MW- 25 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
25		SS#5	5	
			6	
		C		Light gray, fine to medium sand.
		SS#6		SI: 29-31' BLS RE: 1.5'
			3	1.5' - Light gray (5YR 7/1) coarse to fine sand,
30			3	trace silt.
			4	
			4	
		C		Light gray sand.
		SS#7		SI: 34-36' BLS RE: 1.9'
			1	0.5' - Light gray (5YR 7/1) coarse to medium sand.
			2	1.4' - Tan (10YR 5/6) coarse to medium sand.
35			2	
			2	
		C		Tan, coarse to fine sand.
		SS#8		SI: 39-41' BLS RE: 1.7'
			4	1.7' - Light grayish brown (10YR 6/7) coarse sand,
40			2	some medium to fine sand, some pebbles.

DRILLING LOG

MW- 25 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
40		SS#8	2	
			5	
		C		Tan to yellowish brown, coarse to medium sand, trace silt, trace pebbles.
		SS#9		Upon lowering split spoon sampler, discovered over 2.0' of heave in augers. Decided sample recovery would be impossible.
45				
		C		Light to medium brown, fine to coarse sand.
		C		Light brown, fine to coarse sand, trace pebbles.
		SS#10	10	SI: 49-51' BLS RE: 0.5'
			12	0.5' - Tan (10YR 6/2) to yellowish brown (10YR 5/8)
50			15	coarse to very coarse sand.
			15	
		C		Light yellowish brown coarse sand, trace very coarse sand, some fine sand.
		SS#11		SI: 54-56' BLS RE: 0.6'
			9	0.6' - Dark yellowish brown (10YR 4/6) coarse to very
55			9	coarse sand, noted trace of clay on bottom

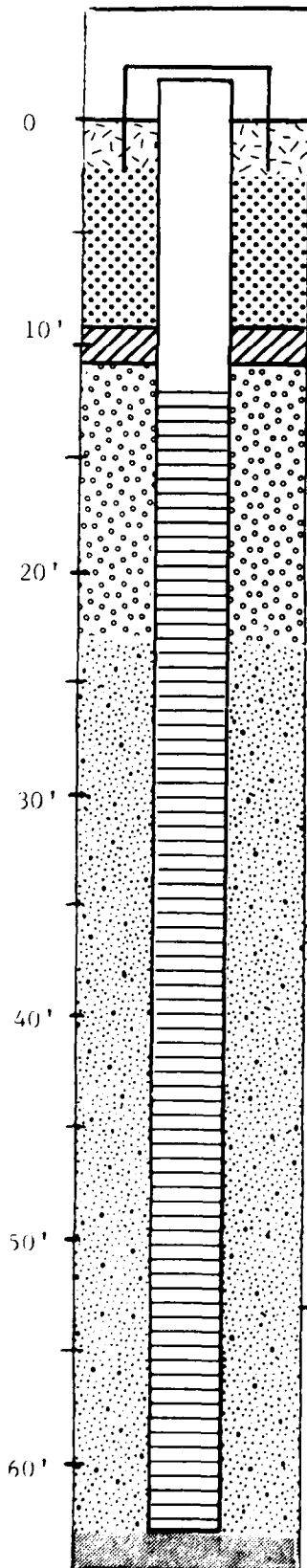
## DRILLING LOG

MW-25 cont.

[illegible]

**WELL CONSTRUCTION SUMMARY**

Project: Dover AFB Owner: U.S. Air Force Well No.: MW-27



**Drilling Summary:**

Total Depth: 63' Drillers: Gary Truver  
Borehole Diameter(s): 6" Walton Corporation  
Rig Type: CME Auger  
Elevation: Land Surface: 22.21' Bit(s): Hollow stem auger  
Top of Casing: 24.21' Drilling Fluid Type: None  
Supervisory Geologist: Richard Eades Amount Use:   
Log Book No. 5 pp. 36-51 Water Level: 13.5' BLS 11/9/84

**Well Design:**

Casing: Material: Schedule 40 PVC Screen: Material: Schedule 40 PVC  
Diameter: 2" ID 2 3/8"OD Diameter: 2"  
Length: 15' Slot: 0.010; 5 slots/inch  
Filter: Material: 4Q Sand Setting: 13-63'  
Setting: 11'-23' Seals: Type: Bentonite  
Grout: Type: #1 Portland Cement/Ben Setting: 9'-11'  
Setting: LS-9.0' Surface Casing: Steel/PVC  
Other: Formation allowed to cave, providing natural sand pack from  
23.0 - 63.0' . Protective steel casing cemented into  
land surface.

**Time Log:**

**Started**

**Completed**

Drilling:	11/8/84	1330 hrs	11/12/84	1100 hrs
Installation:	11/12/84	1100 hrs	11/12/84	1200 hrs
Water Level Reading:			11/9/84	0900 hrs
Development :				

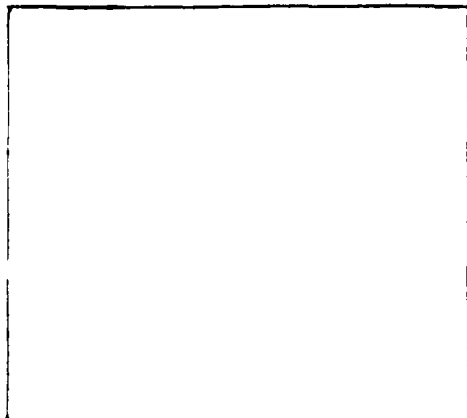
**Well Development:**

Method/Equipment: Air blown for 8 hours, pumped at 10 ppm for  
minimum 2 hours and until clear.



## DRILLING LOG

Project: Dover AFB Owner: U.S. Air Force Well No.: MW-27



Site Sketch

Location: Hazardous Field Book No.: 5 pp 36-51

Waste Storage Area Log By: Rick Eades

Site S-1 Driller: Gary Truver

Rig Type: CME Auger

Reference Total

Point: Land Surface Depth: 63'

Reference Date Time

Point

Elevation:  Drilling Started: 11/8/84 1330hrs

Drilling Completed: 11/12/84 1100

Water Level: 13.5' 11/9/84 0900

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	Legend	DESCRIPTION	Gradation
				SI: Sampling Interval RE: Recovery SS: Split Spoon C: Cuttings		Trace 1-12 Little 12-20 Some 20-30 Add "Y" 30
0						
		C			Brown silt, some clay, some fine sand, trace pebbles.	
		SS#1		SI: 3.5-5.5'	RE: 1.3'	
			3		1.3' - Grayish brown (10YR 5/2) clay with thin interbeds	
			4		of orange silt.	
			5			
5			6			
		C			Light grayish brown clay.	
		C			Light gray silt, trace sand, trace clay.	
		SS#2		SI:		
			8			
			12			
10			22			

**DRILLING LOG**

MW- 27 cont.

Depth (feet)	Graphic Log	Sample Type and Number	Blow Count (N)	DESCRIPTION
10		SS#2	8	SI: 8.5-10.5' BLS RE: 1.3'
			12	0.3' - Orange brown (5YR 4/6) coarse sand.
			22	0.4' - Light gray (10YR 7/1) fine sand.
			25	0.5' - Light gray (10YR 7/1) fine sand.
				0.3' - Light yellow brown (10YR 5/8) fine to medium sand.
		C		Light yellowish brown, sand, some silt, trace clay.
		SS#3		SI: 13.5-15.5' BLS RE: 1.9'
			1	1.9' - Light gray (10YR 7/1) coarse to fine sand, some
			2	silt, wet.
15			1	
			2	
		C		Light gray, fine to medium sand.
		SS#4		SI: 18.5-20.5' BLS RE: 1.6'
			5	1.6' - Light gray (10YR 7/1) coarse to medium sand,
			10	some pebbles.
20			9	
			11	
		C		Light gray sand.
		SS#5		SI: 23.5-25.5' BLS RE: 0.5'
			10	0.5' - Light gray (5Y 7/1) coarse to medium sand,
			7	some pebbles, trace clay.
25			10	

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
25		SS#5	8	
		SS#6		SI: 28.5-30.5' BLS RE: 0.8'
		5		0.8' - Yellowish brown (10YR 7/6) coarse to medium
		8		sand, some pebbles.
		9		
30		12		
		SS#7		SI: 33.5-35.5' BLS RE: 1.3'
		5		1.3' - Yellowish brown (10YR 7/8) coarse to fine
		5		sand, trace pebbles.
		6		
35		8		
		C		Gray to grayish brown sand.
		SS#8		SI: 38.5-40.5' BLS RE: 0.8'
		4		0.8' - Light brown (10YR 7/6) coarse to medium
		8		sand, some pebbles.
40		8		

DRILLING LOG

MW-27 cont.

Depth (feet)	Graphic Log	Sample type and Number	Blow Count (N)	DESCRIPTION
40		SS#8	9	
		C		Light grayish brown, fine to medium sand.
		SS#9		SI: 43.5-45.5' BLS RE: 1.2'
		9		0.5' - Yellowish brown (10YR 7/8) coarse to medium sand.
		10		0.7' - Dark yellowish brown (10YR 5/8) coarse to very
45		9		coarse sand, some cobbles.
		10		
		C		Yellowish brown, coarse to medium sand, some cobbles.
				Note: No split spoon sample attempted for the interval
				of 48.5-50.5' since over 2.0' of heave occurred
				in augers.
50				
		SS#10		SI: 53.5-55.5' BLS RE: 0.6'
		6		0.6' - Yellowish brown (10YR 5/8) coarse sand and
		8		cobbles.
55			10	

# DRILLING LOG

MW-27 cont.

[illegible]

APPENDIX E: Field Data

TABLE E-1  
FIELD ANALYTICAL DATA FOR GROUNDWATER SAMPLES

Monitoring Location	Date of Sample	pH (Std. Units)	Conductivity (uMhos/cm)	Temperature (°C)
01j	12/6/84	4.5	165	28
	2/22/85	4.68	163	19.5
02j	12/6/84	6.3	275	16
	2/22/85	5.98	136	14.5
04j	12/6/84	5.2	500	15
	2/22/85	4.76	480	12.5
05j	12/4/84	4.6	145	14.7
06j	12/4/84	3.8	250	14
07j	12/4/84	5.0	200	14
08j	12/4/84	5.0	380	14
09j	12/4/84	4.35	200	15
10	11/29/84	5.3	125	13
	2/21/85	5.6	162.5	8.1
11	11/29/84	5.7	112	13
	2/21/85	5.76	163	9.0
12	11/29/84	5.45	80	12
	2/21/85	5.35	132	9.9
13	11/30/84	6.21	250	13
	2/21/85	6.02	2600	9.9
14	12/4/84	4.8	55	12.8
15	12/4/84	5.4	450	13
16	12/4/84	4.6	65	12
17	12/4/84	4.5	145	12.8
18	12/11/84	5.3	130	14
19	12/11/84	5.6	120	14
20	12/11/84	5.9	200	14
21	11/30/84	5.6	148	15
	2/21/85	5.72	146	8.5
22	11/30/84	5.51	90	15
	2/21/85	5.4	139	9.8
23	11/30/84	5.1	155	15
	2/21/85	5.16	175	9.5
24	12/11/84	6.4	170	15.7
	2/21/85	5.84	480	11.9
25	12/11/84	5.7	100	16.0
	2/21/85	5.66	178	12.0
27	12/11/84	5.7	125	15.5
	2/21/85	5.31	169	12.5
101	12/6/84	4.8	200	14.6
	2/22/85	4.93	220	12.1
102	12/6/84	5.3	400	15
	2/22/85	5.66	470	12.1
103	12/6/84	5.7	1300	12.2
	2/22/85	5.29	260	12.0
p01	12/11/84	6.70	250	17.0
p02	12/11/84	5.9	160	16.1
p03	12/11/84	6.4	200	17.6
p05	12/6/84	6.6	250	13.7
p06	12/6/84	7.3	400	14
p07	12/6/84	6.5	700	15
p08	12/6/84	6.1	130	14

TABLE E-2

## FIELD ANALYTICAL DATA FOR SURFACE WATER SAMPLES

Monitoring Location	Date of Sample	pH (Std. Units)	Conductivity (uMhos/cm)	Temperature (°C)
SW1	12/12/84	8.25	620	11.1
	2/22/84	7.58	510	8.2
SW2	12/12/84	7.8	720	9.2
SW3	12/7/84	6.4	110	4
SW4	12/7/84	6.2	150	7.5
SW5	12/7/84	6.7	220	3.8
SW6	12/7/84	6.6	155	7
SW7	12/7/84	6.4	132	4
SW8	12/7/84	6.6	120	1.6
SW9	12/14/84	6.9	300	12.9
SW10	12/14/84	6.5	185	12.6
SW11	12/13/84	6.7	140	8.9
SW12	12/13/84	6.9	135	8.5
SW13	12/13/84	6.8	140	9.6
SW14	12/13/84	6.4	80	9.4



## WATER LEVELS

				LEVEL H <sub>2</sub> O	LEVEL H <sub>2</sub> O					LEVEL H <sub>2</sub> O	LEVEL H <sub>2</sub> O	
	WELL	DATE	TIME	BTC	MSL	Well	DATE	TIME	BTC	MSL		
1	18	11/14/84	1059	12.62	7.11	021	11/15/84	1515	9.33	8.70	1	
2	19	"	1118	9.99	6.28	022	"	1530	11.44	8.75	2	
3	20	"	1125	6.19	6.15	023	"	1545	12.56	8.83	3	
4	10	"	1150	13.53	8.85	024	"	1625	16.35	9.26	4	
5	11	"	1210	12.96	8.80						5	
6	12	"	1225	12.96	8.85	024	11/16/84	0730	16.23	9.38	6	
7	13	"	1240	14.09	8.88	027	"	0738	15.02	9.19	7	
8	21	"	1400	9.30	8.73	025	"	0744	17.35	9.47	8	
9	22	"	1410	11.41	8.78	018	"	0801	12.63	7.10	9	
10	23	"	1420	12.42	8.97	020	"	0805	6.19	6.15	10	
11	24	"	1435	16.23	9.38	019	"	0814	10.01	6.26	11	
12	25	"	1450	17.35	9.47	010	"	0820	13.48	8.90	12	
13	27	"	1458	14.98	9.23	011	"	0825	12.94	8.82	13	
14	015	"	1510	10.94	10.45	012	"	0826	12.91	8.90	14	
15	101	"	1510	13.12	11.89	013	"	0828	14.07	8.90	15	
16	102	"	1510	12.88	11.63	021	"	0830	9.27	8.76	16	
17	103	"	1515	12.87	11.75	022	"	0833	11.37	8.82	17	
18	14	"	1515	15.23	5.93	023	"	0838	12.47	12.47	18	
19	095	"	1600	11.79	4.56	102	"	1040	17.19	10.16	19	
20	055	"	1600	13.06	4.34	101	"	1055	14.59	13.43	20	
21	075	"	1600	8.74	3.83	P03	"	1125	14.30	12.69	21	
22	085	"	1600	10.98	3.22	P08	"	1135	11.01	15.83	22	
23	17	"	1600	7.05	3.22	P07	"	1140	9.91	16.17	23	
24	15	"	1600	6.84	4.27	P05	"	1145	8.84	16.03	24	
25	16	"	1600	6.53	4.04	105	"	1145	14.10	14.77	25	
26											26	
27	018	11/15/84	1000	12.58	7.15	010	11/28/84	1042	13.6	8.78	27	
28	018	"	1123	12.58	7.15	011	"	1307	13.06	8.70	28	
29	019	"	1205	10.05	6.22	012	"	1314	13.03	8.78	29	
30	020	"	1239	6.30	6.04	013	"	1318	14.18	8.79	30	
31	013	"	1430	14.20	8.77						31	

BTC = Below Top of CASE

MSL = MEAN SEA LEVEL

(2)

DOVER AFB DOVER DE. 2-827-06-182-56 IRP Phase II

## WATER LEVELS.

	WELL	DATE	TIME	LGVL H <sub>2</sub> O BTC	LEVEL H <sub>2</sub> O MSL	Well	DATE	TIME	LEVEL H <sub>2</sub> O BTC	LEVEL H <sub>2</sub> O MSL	
1	022	11/29/84	0824	14.22	7.59	018	12/10/84	1100	12.58	7.15	1
2	023	"	0840	12.55	8.84	019	"	1200	9.94	6.33	2
3	022	"	1004	11.36	8.83	020	"	1214	6.19	6.15	3
4	021	"	1020	9.37	8.66	P02	"	1400	16.28	11.07	4
5						P01	"	1400	15.32	12.70	5
6	005T	12/3/84	1050	13.48	7.22	P03	"	1400	14.26	12.73	6
7	014	"	1155	15.29	5.87	024	"	1541	16.64	8.97	7
8	016	"	1220	6.36	4.21	025	"	1546	16.30	10.52	8
9	09T	"	1357	11.48	4.87	027	"	1600	15.41	8.80	9
10	015	"	1420	6.74	4.37						10
11	017	"	1430	7.1	3.17						11
12	06T	"	1456	13.03	4.37	(DATA before wells developed)					12
13	07T	"	1510	8.66	3.91	075	11/9/84	0859	8.70	3.87	13
14	08T	"	1533	10.71	3.49	06T	"	0910	13.8	3.60	14
15						09T	"	0925	11.68	4.67	15
16	01T	12/5/84	0915	10.21	11.18	015	"	0937	6.82	4.29	16
17	04T	"	0930	14.68	10.72	016	"	0946	6.51	4.06	17
18	02T	"	0955	16.63	10.93	011	"	0955	15.18	5.98	18
19	101	"	1050	13.42	11.59						19
20	102	"	1050	13.08	11.43						20
21	103	"	1050	13.14	11.48						21
22	P08	"	1410	11.39	15.45						22
23	P07	"	1410	10.26	15.92						23
24	P06	"	1410	13.20	15.67						24
25	P05	"	1410	9.22	15.65						25
26											26
27											27
28											28
29											29
30											30
31											31
32											32
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48											48
49											49
50											50

BTC = Below Top of CASE

MSL = MEAN SEA LEVEL

(2)

DOVER AFB DOVER DE. 2-827-06-182-56 1R1 NAHSC II  
WATER LEVELS.

	WELL	DATE	TIME	LEVEL H <sub>2</sub> O BTC	LEVEL H <sub>2</sub> O MSL	Well	DATE	TIME	LEVEL H <sub>2</sub> O BTC	LEVEL H <sub>2</sub> O MSL	
1	01J	1/9/85	1125	4.51	9.88	P08	1/9/85	1105	11.83	15.01	1
2	02J	"	1135	16.89	10.67	101	"	1145		11.26	2
3	04J	"	1150	14.96	10.44	102	"	1140		11.11	3
4	05J	"	1320	13.26	6.81	103	"	1135		11.17	4
5	06J	"	1328	12.86	4.54	ST.4A	"	1150		8.66	5
6	07J	"	1331	8.48	4.09	ST.4B	"	1150		8.71	6
7	08J	"	1334	10.59	3.61	ST.5	"	1150		9.08	7
8	09J	"	1337	16.61	4.74						8
9	010	"	1050	13.44	8.94						9
10	011	"	1103	12.92	8.84						10
11	012	"	1059	12.98	8.83						11
12	013	"	1054	14.10	8.87						12
13	014	"	1315	15.33	5.83						13
14	015	"	1320	6.79	4.32						14
15	016	"	1320	6.53	4.04						15
16	017	"	1325	7.07	3.20						16
17	018	"	1030	12.70	7.03						17
18	019	"	1040	9.66	6.66						18
19	020	"	1045	6.10	6.24						19
20	021	"	1109	9.24	8.79						20
21	022	"	1112	11.35	8.84						21
22	023	"	1116	12.45	8.94						22
23	024	"	1128	16.99	8.62						23
24	025	"	1124	18.13	8.69						24
25	027	"	1133	15.75	8.46						25
26	P01	"	1030	13.98	15.04						26
27	P02	"	1035	17.31	10.01						27
28	P03	"	1040	14.07	12.92						28
29	P05	"	1115	10.60	14.27						29
30	P06	"	1110	13.53	15.34						30
31	P07	"	1110	10.55	15.63						31

BTC = Below Top of Case  
MSL = MEAN SEA LEVEL

DOUGLAS, DOUGLAS. 2-827-06-182-56 1st PHASE II

WATER LEVELS.

	WELL	DATE	TIME	LEVEL H <sub>2</sub> O BTC	LEVEL H <sub>2</sub> O MSL		WELL	DATE	TIME	LEVEL H <sub>2</sub> O BTC	LEVEL H <sub>2</sub> O MSL	
1	01J	2/10/85	1334	10.34	11.05							1
2	02J	"	1324	15.91	11.65							2
3	04J	"	1327	13.85	11.55							3
4	05J	"	1223	12.15	7.92							4
5	06J	"	1226	11.44	5.96							5
6	07J	"	1229	7.13	5.44							6
7	08J	"	1231	9.33	4.87							7
8	09J	"	1235	10.19	6.16							8
9	010	"	1035	11.60	10.78							9
10	011	"	1500	11.03	10.73							10
11	012	"	1512	11.03	10.78							11
12	013	"	1514	13.18	9.79							12
13	014	"	1249	14.17	6.99							13
14	015	"	1245	5.66	5.45							14
15	016	"	1243	5.16	5.11							15
16	017	"	1240	6.10	4.17							16
17	021	"	0850	7.17	10.86							17
18	022	"	0855	9.39	10.80							18
19	023	"	1006	10.49	10.90							19
20	024	"	1754	15.58	10.03							20
21	025	"	1823	16.72	10.10							21
22	027	"	1806	14.45	9.76							22
23	101	"	1538	12.64	12.37							23
24	102	"	1340	12.30	12.21							24
25	103	"	1246	12.47	12.15							25
26												26
27												27
28												28
29												29
30												30
31												31

BTC = Below Top of CASE

MSL = MEAN SEA LEVEL

APPENDIX F: Sampling and Analysis Instructions

SAMPLING INSTRUCTIONS:  
Dover AFB Phase II Stage 1  
(Prepared By JRB Laboratories)

(Note: For samples taken in duplicate, double number of containers)

WATER

1. Oil and Grease: Use 1-liter glass bottle. Rinse bottle with approximately 50 ml of sample and discard, fill bottle approximately 90% full with sample; add approximately 1-2 ml of HCl\* (1-2 squirts with enclosed pipet), cap and invert 2-3 times; place on ice.
2. TOC (Total organic carbon): Use 120 ml amber glass bottles. Add approximately 1 ml H<sub>2</sub>SO<sub>4</sub>\*\* (1 squirt with enclosed pipet) to empty bottle, add sample until bottle is completely filled (no head space) cap and invert bottle, if air bubble exist reopen and add more sample. Store on ice. Note: Teflon (shiny) side of cap septa faces sample and white dull side faces up.
3. TOX (Total organic halides): 120 ml amber glass bottles. Add a few drops (5) of 1M sodium sulfite and 1 ml (1 squirt) of HNO<sub>3</sub>\*\*\* to the empty bottle; add sample until bottle is completely filled (no head space) cap and invert bottle; if air bubble exists, reopen and add more sample. Store on ice. Note: Teflon (shiny) side of cap septa faces samples and white dull side faces up (U.S. EPA, 1982c).
4. Phenol: Use 1 liter amber glass bottle. Rinse bottle with approximately 50 ml of sample and discard; fill bottle greater than 3/4 full; add 2 ml (2 squirts) of H<sub>3</sub>PO<sub>4</sub>\*\*\*\* and approximately 1 gram of cupric sulfate powder.

Method for Cupric Sulfate Addition

- using spatula, add cupric sulfate to line on vial (measuring vessel)
- add to Phenol sample container
- \* Note: do not breath or come into contact with cupric sulfate.

Cap and invert bottle 2-3 time to mix, store on ice.

5. Metals: Use 1 liter plastic (LPE) bottle. Fill bottle approximately 3/4 with sample, and 2 ml (1 squirt) of HNO<sub>3</sub>. Cap and invert 2-3 times; store on ice.

- \* HCl = Hydrochloric Acid
- \*\* H<sub>2</sub>SO<sub>4</sub> = Sulfuric Acid
- \*\*\* HNO<sub>3</sub> = Nitric Acid
- \*\*\*\* H<sub>3</sub>PO<sub>4</sub> = Phosphoric Acid
- \*\*\*\*\* NaOH = Sodium Hydroxide

6. Volatile organics (VOA): Use 4-40 ml clear (small) jars (VOA vials) with teflon septa. Add sample until bottle is completely filled (no head space). Cap and invert bottle; if air bubble exists, reopen and add more sample. Store on ice. Note: Teflon (shiny) side of cap septa faces sample.
7. Cyanide: Use 1 liter plastic (LPE) bottle. Rinse bottle with approximately 50 ml of sample and discard; fill bottle greater than 3/4 full and add 2 ml (2 squirts) of 10N NaOH\*\*\*\*\* cap and invert 2-3 times; place on ice.
8. Organics: (includes B/N/A, Pesticide, PCB): Use 1 gallon amber bottles with teflon liners. Rinse bottle with approximately 50 ml of sample and discard. Fill bottle 90% full with sample and cap. Store on ice.

#### SEDIMENT/SOILS

1. TOX (Total organic halides): 40 ml clear (small) jars (vials). Fill 2 vials with homogeneous sediment sample, cap and store on ice. Note: Teflon (shiny) side down toward sample.
2. VOA (Volatile organics): 40 ml clear (small jars (VOA vials)). Fill 4 vials with homogeneous sediment sample, cap and store on ice. Note: Teflon (shiny) side faces sample.
3. All other solid parameters are collected in 2-32 oz. wide mouth jars. Fill as full as possible, pour off any excess H<sub>2</sub>O.

#### Chain of Custody:

Every sample should have a SAIC label attached and filled out. List all samples and any comments on enclosed shipping record forms. Keep original (White) copy and send remaining copies with samples. Tape ice chest shut and initial tape seam.

\* HCl = Hydrochloric Acid  
 \*\* H<sub>2</sub>SO<sub>4</sub> = Sulfuric Acid  
 \*\*\* HNO<sub>3</sub> = Nitric Acid  
 \*\*\*\* H<sub>3</sub>PO<sub>4</sub> = Phosphoric Acid  
 \*\*\*\*\* NaOH = Sodium Hydroxide











SCIENCE APPLICATIONS  
INTERNATIONAL CORPORATION

DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY

476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

SAMPLE SHIPPING RECORD

Shipment No.

*12345*

CONSIGNEE

Name

*SAI*

No. Street

*476 Prospect Street*

City, State, Zip

*La Jolla, CA 92038*

SAMPLE ANALYSIS

Name				No. Street				City, State, Zip				Sample No.		Sample Date		Packed Time		No. Containers		Sample Description		Ext. Organics		Surv. Ext. Organics		Surv. Vol. Organics		Trace Metals		Other Inorganics		Pesticides		Herbicides		LMWHC		HMWHC		Radionuclides		Organic Phosphates		TOC		TSS		VSS		DOC		POC		Oil and Grease		Lipids		Part. Size Dis.		Sediment Core Date		Remarks																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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3 coolers to 70772

SHIPPING CHAIN OF CUSTODY

SAI Lab No.	Day	Time	Received By (sign)	Date	Time	Received By (sign)	Date	Time	
12345	1/1	0915	SAI	1/1	0915	SAI	1/1	0915	
City and Method	Signature By (sign)	Day	Time	Received By (sign)	Date	Time	Received By (sign)	Date	Time
La Jolla, CA	SAI	1/1	0915	SAI	1/1	0915	SAI	1/1	0915



SCIENCE APPLICATIONS  
INTERNATIONAL CORPORATION

DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY  
476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

# SAMPLE SHIPPING RECORD

Shipment No.

Dover 5

## CONSIGNEE

Name

ED THAKKAL - JR3

No. Street

8100 WEST PARK DRIVE

City, State, Zip

ARLINGTON VA 22102

## SAMPLE ANALYSIS

Sample No	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Vol. Organics	Surv. Ext. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Cyanide	TOC	BOD	VSS	DOC	POC	Oil and Grease	Lipids	Part. Size Dis.	Sediment Core Date	Remarks
SW003	12/7/88	1440	6	3 SW FROM CONTAINER WITH																					METALS NOT ARRIVED
SW004	12/7/88	1445	6	SW FROM CONTAINER " "																					
SW005	12/7/88	1445	6	SW " " " "																					
SW006	12/7/88	1430	6	SW " " " "																					
SW007	12/7/88	1440	6	SW " " " "																					
SW008	12/7/88	1440	6	SW " " " "																					
QA11	12/7/88	1440	6	QA																					
Total No. Containers				42																					

## SHIPPING CHAIN OF CUSTODY

SAI (Shipper)	Date	Time	Received By (sign)		Date	Time	Received By Courier (sign)		Date	Time
12/7/88	12/7	1440	B. P. M. (Signature)		12-10	1100	M. C. (Signature)		12/10	1100
Shipping Method	Shipped By (sign)		Corner From Airport (sign)		Date	Time	Received By Contract 1st (sign)		Date	Time
			B. P. M. (Signature)		12-10	1100	M. C. (Signature)		12/10	1100

SAI Form 501

Control Lab Representation

Dist. Control Lab

Call Forward Lab. Bureau

SAI







SCIENCE APPLICATIONS  
INTERNATIONAL CORPORATION

DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY  
476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

SAMPLE SHIPPING RECORD

Shipment No

10008

CONSIGNEE

Name: SAI  
No. Street: 3400 WEST PARK DR.  
City, State, Zip: VA 22102

SAMPLE ANALYSIS

Sample No	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanide	TOC	BOD	TSS	VSS	DOC	POC	Oil and Grease	Lipids	Part. Size Dis.	Sediment Core Date	Remarks
10001	12/12	1700	4	FT-3 SURNAME																								
10002	12/12	1630	4	FT-3 SURNAME																								
10003	12/12	1600	4	FT-3 SURNAME																								
10004	12/12	1530	4	FT-3 SURNAME																								
10005	12/12	1700	4	FT-3 SURNAME																								
10006	12/12	1630	4	FT-3 SURNAME																								
10007	12/12	1600	4	FT-3 SURNAME																								
10008	12/12	1530	4	FT-3 SURNAME																								
10009	12/12	1600	4	FT-3 SURNAME																								
10010	12/12	1530	4	FT-3 SURNAME																								
Total No. Containers																												

SHIPPING CHAIN OF CUSTODY

SAI (by Sign)	Date	Time	Received By (Sign)	Date	Time	Received By Courier (Sign)	Date	Time	Received By (Sign)	Date	Time
SAI	12/12	1700	B. P. M. - B. N.	12/14	1100	Michael H. Buehler	12/14	1100			
Shipping Method	FEDEX										

SAI Contract Lab. County Lab. Representative. Goldenrod Lab. Returns to SAI



## SAMPLE SHIPPING RECORD

**DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY**  
476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

Shipment No

Over

**CONSIGNEE**

Name \_\_\_\_\_

ELIOT, W. K. / J. B. ASSOCIATES

No., Street

2401 Wilshire Blvd

City, State, Zip

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SECRET

Sample Description

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Packed

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REFERENCE SAMPLE

St Lawrence St. - South

7-10-68

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$$L_{i-1} \cup \{v\} \subseteq M, L_i$$
[illegible]

### SHIPPING CHAIN OF CUSTODY

SAI (by) (sign)

Date \_\_\_\_\_

Received By (signature) \_\_\_\_\_

Received By (sign)	Counter From Airport (sign)
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(rubris) Ag pedding

1.

Courier From Airport (sign)

Date	Time
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Received By Contract Lab (sign)

Time

Time

1915-1916, 1917-1918

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**SCIENCE APPLICATIONS, INC.**

## SAMPLE SHIPPING RECORD

**DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY**  
**476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791**

Shipment No.

01-83100

## **CONSIGNEE**

Name \_\_\_\_\_

721.

No. Street

City, State, Zip

2012

[illegible]

# SHIPPING CHAIN OF CUSTODY

SAI (by) (Sign)

1

Date	Time
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Received By (Sign)

Date	Time
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Received By Courier (signature)

Date:	Total:
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Shipping Method	Shipped By (Sign)

1

Courier From Airport (Return)

Date	Time
------	------

Received By Contract Job (sum)

Date	Time
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18/01/2025

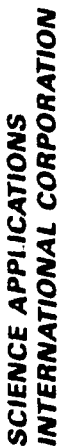
## Can you help?

High Capacity

C. H. Anderson, J. A. B. Robertson, and S. C. A.







## SAMPLE SHIPPING RECORD

DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY

476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

AT 1753

Shipment No

100

CONSIGNEE				SAMPLE ANALYSIS														REMARKS																	
Name	No. Street	City, State, Zip	Sample No.	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanide	pH	TOC	BOD	TSS	VSS	DOC	POC	Oil and Grease	Lipids	Part. Size Dis	Sediment Core Date				
Analytical Tech Inc. 3028 St. Natural City, Ca.			85-4544	12/5	1500	4	MW010	✓																											
			4545			4	MW011	✓																											
			4546			4	MW012	✓																											
			4547			4	MW013	✓																											
			4548			4	MW 021	✓																											
			4549			4	MW 022	✓																											
			4550			6	MW 023	✓																											
			4551			4	QA1	✓																											
			4552			4	QA2	✓																											
			4553			3	QA3	✓																											
4554			4	QA4	✓																														
4555			4	QA5	✓																														
			Total No Containers			49																													

**SHIPPING CHAIN OF CUSTODY**

SA (by Sign) [Signature] Date 12/14/50 Time

Shipping Method Can Shipped By (Sign) [Signature] Date 12/14/50 Time

Received By (Sign)  Date  Time

Received By Contract Lab (Sign)  Date 12/15/50 Time



Analytical Technologies, Inc.

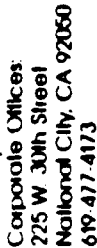
Corporate Offices:  
225 W 30th Street  
National City, CA 92060  
619 477 4173

# Chain of Custody Record

pg 1 1/2

PROJECT NO	PROJECT NAME	SAMPLE TYPES										OTHER	NUMBER OF CONTAINERS	REMARKS	
STATION NUMBER	DATE	TIME	STATION LOCATION	General Inorganic	Metals	Nutrients	Oil & Grease	Cyanide	Organics	Solids-Inorganics	Volatile Organics	Fuel	Oil	Industrial Hygiene	
1			85-4544 MW010								X				
2			- 4545 MW011								X				
3			- 4546 MW012								X				
4			- 4547 MW013								X				
5			- 4548 MW021								X				
6			- 4549 MW022								X				
7			- 4550 MW023								X				
8			- 4551 QA 1								X				
9			- 4552 QA 2								X				
10			- 4553 QA 3								X				
				TOTAL NUMBER OF CONTAINERS											
RELINQUISHED BY: (Signature)				RECEIVED BY: (Signature)				RELINQUISHED BY: (Signature)				RECEIVED BY: (Signature)			
DATE/TIME				DATE/TIME				DATE/TIME				DATE/TIME			
12/1/12 12:00 PM				12/1/12 12:00 PM											
RELINQUISHED BY: (Signature)				RECEIVED BY: (Signature)				RELINQUISHED BY: (Signature)				RECEIVED BY: (Signature)			
DATE/TIME				DATE/TIME				DATE/TIME				DATE/TIME			
METHOD OF SHIPMENT				SHIPPED BY: (Signature)				COURIER: (Signature)				RECEIVED FOR LAB BY: (Signature)			

DISTRIBUTION: Original accompanies shipment. Copy to field files.



2/2

**DISTRIBUTION:** Original accompanies shipment. Copy to field files.



**SCIENCE APPLICATIONS, INC.**

## SAMPLE SHIPPING RECORD

**DIVISION OF ENVIRONMENTAL CHEMISTRY & GEOCHEMISTRY**  
476 PROSPECT STREET, LA JOLLA, CA 92038 • (714) 454-3811

Shipment No

2

**CONSIGNEE**

Name	W. A. R.
No. Street	
City State Zip	

## **SAMPLE ANALYSIS**

[illegible]

### SHIPPING CHAIN OF CUSTODY

SAI (by) (sign)	Date	Time	Received By (sign)	Date	Time	Received By Courier (sign)	Date	Time
Shipping Method	Shipped By (sign)		Courier From Airport (sign)		Time	Date	Date	Time

White - SAI	Canary - Lab Representative	Pink - Contract Lab	Goldenrod - Lab Returns to SAI
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## SAMPLE SHIPPING RECORD

**DIVISION OF ENVIRONMENTAL CHEMISTRY & GEOCHEMISTRY**  
**476 PROSPECT STREET, LA JOLLA, CA 92038 • (714) 454-3811**

Shipment No

**CONSIGNEE**

Name

No 155 ON

City State Zip

## SAMPLE ANALYSIS

[illegible]



SCIENCE APPLICATIONS, INC.

DIVISION OF ENVIRONMENTAL CHEMISTRY & GEOCHEMISTRY  
476 PROSPECT STREET, LA JOLLA, CA 92038 • (714) 454-3811

## SAMPLE SHIPPING RECORD

Shipment No

D-351-1

9/1/84

### CONSIGNEE

Name

Laucks Testing Labs

No. Street

City State Zip

### SAMPLE ANALYSIS

Sample No	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanide	TOC	BOD	TSS	VSS	DOC	POC	Oil & Grease	Lipids	Part. Size Dis.	Sediment Core Date	Remarks
85-4512	1/30		1	MW-023																								
4513	1/29		1	QA1																								
4514			1	QA2																								
4515			1	QA3																								
4516	1/30		1	QA4																								
4517			1	QA5																								
4518			1	Bailey Wash																								
4519			1	Trill Blank																								
4520	1/29		1	MW-010																								
4521			1	MW-011																								
4522			1	MW-012																								
4523	1/30		1	MW-013																								
4524			1	MW-021																								
4525			1	MW-022																								

Total No. Containers 1412 WATERS

### SHIPPING CHAIN OF CUSTODY

SAI (by sign)	Time	Received By (sign)	Date	Time	Received By (sign)	Date	Time
Mitchell K. Beckel	1/29	1500	1/29	1500	1/29	1500	1500
Shipping Method	Shipped By (sign)	Carrier From Airport (sign)	Date	Time	Received By Contract Lab (sign)	Date	Time

White - SAI

Canary - Lab Representative

Pink - Contract Lab

Goldenrod - Lab Returns to SAI



SCIENCE APPLICATIONS  
INTERNATIONAL CORPORATION

DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY

476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

## SAMPLE SHIPPING RECORD

Shipment No  
**A-351-1**

**pg. 2 of 4**

### CONSIGNEE

Name **Lauchs Testing Labs**

No Street

City, State, Zip

### SAMPLE ANALYSIS

Sample No	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanide	TOC	Therapies	VSS	DOC	POC	Oil and Grease	Lipids	Part Size Dis	Sediment Core Date	Remarks
85-4506	11/29		1	MW-010																							
4507			1	MW-011																							
4508			1	MW-012																							
4509	11/30		1	MW-013																							
4510			1	MW-021																							
4511			1	MW-022																							
4526			1	MW-023																							
4527	11/29		1	QA1																							
4528			1	QA2																							
4529			1	QA3																							
4530	11/30		1	QA4																							
4531			1	QA5																							
4586	11/29		1	MW-010																							
4587	11/29		1	MW-012																							
Total No. Containers				14	WATERS																						

### SHIPPING CHAIN OF CUSTODY

Date	Time	Received By (Sign)	Date	Time	Received By (Sign)	Date	Time	Received By (Sign)	Date	Time	Received By (Sign)
11/29	1500	Michael Benkel	12/1	1500	Federal Express	12/1	1500	1500	1500	1500	1500
Shipped By				Received By (Sign)				Received By (Sign)			
Michael Benkel				Federal Express				1500			
Checked By (Sign)				Checked By (Sign)				Checked By (Sign)			



## SAMPLE SHIPPING RECORD

## DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY

476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

Shipment No

0.351-1

Page 3 of 4

**CONSIGNEE**

Name \_\_\_\_\_

Lauck's Testing Labs

**No Street**

City. State. Zip

after Tom Owens

[illegible]

## SHIPPING; CHAIN OF CUSTODY

AI (by) (signature)

SAI (by) (sign)	<i>Mr. Barker</i>
Shorthand Method	Shorthand By (sign)

Date 1/4/4	Time 1:30 PM	Received By (Signature) Barbara Federal
---------------	-----------------	--

Received By (sign)  
*Federal Express*  
Contract From Amount (dollars)

Date	Time
12/4	5:00pm

Received By ~~Customer~~ \_\_\_\_\_

Date	Time
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SCIENCE APPLICATIONS  
INTERNATIONAL CORPORATION

DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY  
476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

## SAMPLE SHIPPING RECORD

Shipment No.

D-351-1

Pg 4 of 4

### CONSIGNEE

Name

Lauks Testing Labs

No. Street

City, State, Zip

### SAMPLE ANALYSIS

Name Laucks Testing Labs		City State, Zip		Sample Description		Ext Organics		Surv Ext. Organics		Vol. Organics		Surv. Vol. Organics		Trace Metals		Other Inorganics		Pesticides		Herbicides		LMWHC		HMWHC		Radionuclides		Drugs		Cyanide		pH		TOC		<del>BOD</del> <i>Thermals</i>		VSS		DOC		POC		Oil and Grease		Lipids		Part Size Dis		Sediment Core Date		Remarks																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
85-4588	11/29																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										

### SHIPPING CHAIN OF CUSTODY

SAI (Shipper)	Shipped By (Sign)	Date	Time	Received By (Sign)	Date	Time	Received By (Sign)	Date	Time
Michael Bunker	12/4	1500	12/4	1500	12/4	1500	12/4	1500	12/4
Shipped Method	Shipped By (Sign)	Date	Time	Received By (Sign)	Date	Time	Received By (Sign)	Date	Time

## SAMPLE SHIPPING RECORD

## DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY

476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

Shipment No

0-351-2

20163

## CONSIGNEE

Name \_\_\_\_\_

Name Laucks Testing Lab  
No.        Street       

**No Street**

City, State, Zip

Attn. Tim Duvak

## SAMPLE ANALYSIS

Name Lucks Testing Lab		City, State, Zip		Sample Description		Remarks	
No. Street		No. Con	Packed	Sample	Sample	Ext. Organics	Vol. Organics
		tainers	Time	Date			
85 - 4607	12/5/14	1	1400		mw 005		
4608		1			mw 006		
4609		1			mw 007		
4610		1			mw 008		
4611		1			mw 009		
4612		1			mw 014		
4613		1			mw 015		
4614		1			mw 016		
4615		1			mw 017		
4616		1			QA6		
4617		1			QA7		
4618		1			mw 005		
4619		1			mw 006		
4620		1			mw 007		

## SHIPPING CHAIN OF CUSTODY

SALIVARY (SILVER)	0 D	0 A	Date
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SALARY (Said)	<i>Murphy Bechtel</i>	Date	<i>12/5</i>
Signature Member		Signature By (Said)	

J. Baker

Shipped By (sign)  
 Date 12/5  
 AB 0169 277073

Time

Received By (sign) \_\_\_\_\_

Received By (Sign)  
 Contact From Applicant (Sign)

Date	Time
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Date	Time
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Received By Courier (sign)

Received By Courier (sign)  
Federal Express  
Received By Courier (sign)

Date	Time
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Date	Time
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SCIENCE APPLICATIONS  
INTERNATIONAL CORPORATION

DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY  
476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

## SAMPLE SHIPPING RECORD

Shipment No  
**0-351-2**

**pg 2 of 3**

### CONSIGNEE

Name **Lauks Testing Lab**  
No Street  
City State Zip

### SAMPLE ANALYSIS

Sample No	Sample Date	Packed Time	No Containers	Sample Description	Ext. Organics	Vol. Ext. Organics	Surv. Ext. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Phenols	TOC	BOD	TSS	VSS	DCC	POC	Oil and Grease	Lipids	Part Size Dis	Sediment Core Date	Remarks
85-4621	10/5/84	400	1	mw008																							
4622			1	mw009																							
4623			1	mw014																							
4624			1	mw015																							
4625			1	mw016																							
4626			1	mw017																							
4627			1	QAL																							
4628			1	QAT																							
4640			1	mw005																							
4641			1	mw006																							
4642			1	mw007																							
4643			1	mw008																							
4644			1	mw009																							
4645			1	QAL																							
			Total No Containers	14																							

### SHIPPING CHAIN OF CUSTODY

SAIC By (sig)	Date	Time	Received By (sig)	Date	Time	Received By Courier (sig)	Date	Time
<i>Michael B. Beckel</i>						<i>Federal Express</i>		
Shipping Method	AD # 069 227023		Courier From Airport (sig)	Date	Time	Received By Contract Lab (sig)	Date	Time



SCIENCE APPLICATIONS, INC.

DIVISION OF ENVIRONMENTAL CHEMISTRY & GEOCHEMISTRY  
476 PROSPECT STREET, LA JOLLA, CA 92038 • (714) 454-3811

## SAMPLE SHIPPING RECORD

10F3  
Shipment No  
N-351-3

### CONSIGNEE

Name LAUCKS TESTING LAB  
No. Street \_\_\_\_\_  
City State Zip \_\_\_\_\_

Attn: JIM OWENS

### SAMPLE ANALYSIS

Sample No	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanide	pH	TOC	BOD	TSS	VSS	DOC Tox	POC	Oil & Grease	Lipids	Part. Size Dis.	Sediment Core Date	Remarks
85-4767	12/6/80	1:00	1	MWP005															✓										✓
85-4768	7	✓	1	MWP006															✓										✓
85-4769	✓	✓	1	MWP007															✓										✓
85-4770	✓	✓	1	MWP008															✓										✓
85-4771	✓	✓	1	MW001															✓										✓
85-4772	✓	✓	1	MW002															✓										✓
85-4773	✓	✓	1	MW004															✓										✓
85-4774	✓	✓	1	MW101															✓										✓
85-4775	✓	✓	1	MW102															✓										✓
85-4776	✓	✓	1	MW103															✓										✓
85-4777	✓	✓	1	QA8															✓										✓
85-4778	✓	✓	1	QA9															✓										✓
85-4779	✓	✓	1	QA10															✓										✓
85-4780	✓	✓	1	MW001															✓										✓
Sub Total No. Containers				14																									

### SHIPPING CHAIN OF CUSTODY

SAI (by) (sign)	Date	Time	Received By (sign)	Date	Time	Received By (sign)	Date	Time
M. Beckel	12/10		FED EX	12/10				
Shipping Method	Shipped By (sign)	Shipped From Airport (sign)	Received By Contract Lab (sign)	Date	Time	Received By Contract Lab (sign)	Date	Time
APR 11 1981	024372110							

White - SAI      Canary - Lab Representative      Pink - Contract Lab      Goldenrod - Lab Returns to SAI





SCIENCE APPLICATIONS  
INTERNATIONAL CORPORATION

DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY  
476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2701

## SAMPLE SHIPPING RECORD

Shipment No.

0-351-2

Ag 30f3

### CONSIGNEE

Name

Lauk's Testing Lab

No. Street

City State Zip

### SAMPLE ANALYSIS

Name Lamb's Testing Lab		City State Zip		Name Allen Jia Owens		Sample Description		No. Containers		Packed Time		Sample Date		Sample No.	
No.	Street														

Received By Customer (Sign)		Date	Time	Received By Customer (Sign)		Date	Time
Michael Beckel		12/10/83		Federal Express			
Received From Airport (Sign)		Date	Time	Received By Customer Lab (Sign)		Date	Time
BB# 12/10/83							



SCIENCE APPLICATIONS, INC.

DIVISION OF ENVIRONMENTAL CHEMISTRY & GEOCHEMISTRY  
476 PROSPECT STREET, LA JOLLA, CA 92038 • (714) 454-3811

# SAMPLE SHIPPING RECORD

Shipment No

20F 3  
N-351-3

## CONSIGNEE

Name LAUCKS TESTING LAB

No. Street

City State Zip

## SAMPLE ANALYSIS

CONSIGNEE				Name		City State Zip	
LUCKS TESTING LAB							
No. Street							
Sample No				Sample Date		Packed Time	
85-4781				10/6/00		1	
85-4782						1	
85-4783						1	
85-4784						1	
85-4785						1	
85-4786						1	
85-4787						1	
85-4788						1	
85-4789						1	
85-4790						1	
85-4791						1	
85-4792						1	
85-4793						1	
85-4794						1	
Total No. Containers				14			

Name		City State Zip		Sample Description		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date		Packed Time		No. Containers		Sample No		Sample Date	
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## SHIPPING CHAIN OF CUSTODY

SAI (by) (sign)	Date	Time	Received By (sign)	Date	Time	Received By Courier (sign)	Date	Time
M. Buckel	12/10					FED EX	12/10	1500
SAI Method	AFED 024572410		Received By (sign)	Date	Time	Received By Contract Lab (sign)	Date	Time

White - SAI      Canary - Lab Representative      Pink - Contract Lab      Goldenrod - Lab Returns to SAI



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476 PROSPECT STREET, LA JOLLA, CA 92038 • (714) 454-3811

## SAMPLE SHIPPING RECORD

88 30F 3

Shipment No

N-351-3

### CONSIGNEE

LAUCKS TESTING LAB

### SAMPLE ANALYSIS

Sample No	Sample Description	Sample Date	Sample Volume	Sample Type	Ext Organics	Surv Ext Organics	Vol Organics	Surv Vol Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanide	Phenols	TOC	BOD	TSS	VSS	DOC	POC	Oil & Grease	Lipids	Part Size Dis	Sediment Core Date
85-4785	QA 8	12/6/80	1	100																								
85-4796	QA 9		1																									
85-4797	QA 10		1																									
85-4820	MW 001		1																									
85-4821	MW 002		1																									
85-4822	MW 004		1																									
85-4823	MW 101		1																									
85-4824	MW 102		1																									
85-4825	MW 103		1																									
85-4826	QA 8		1																									
85-4827	QA 9		1																									
85-4828	QA 10		1																									
Sub				12																								

ATTN: JIM COWEN

Received By: FED EX Date: 12/10/80 Time: 10:00

Received By: Goldenrod Lab Date: 12/10/80 Time: 10:00

Canary - Lab Representative: White - SAI

Pink - Contract Lab: Goldenrod - Lab Returns to SAI



SCIENCE APPLICATIONS  
INTERNATIONAL CORPORATION

DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY  
476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

## SAMPLE SHIPPING RECORD

Shipment No.  
**D 357-6**

pg 1032

### CONSIGNEE

Name Lawrence Testing  
No. Street \_\_\_\_\_  
City State Zip \_\_\_\_\_

### SAMPLE ANALYSIS

Name Hawkins Testing				City State Zip				Name Atti Jim Chen		Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	TOC	BOD	TSS	VSS	DOC	POC	Oil and Grease	Lipids	Part. Size Dis	Sediment Cure Date	Remarks
4935				12/11				1400	1	SW0003																							
4938									1	SW0004																							
4939									1	SW0005																							
4940									1	SW0006																							
4941									1	SW0007																							
4942									1	SW0008																							
4943									1	Q1711																							
4951									1	SW0003																							
4952									1	SW0004																							
4953									1	SW0005																							
4954									1	SW0006																							
4955									1	SW0007																							
4956									1	SW0008																							
4957									1	Q1711																							
Total No. Containers									14																								

### SHIPPING CHAIN OF CUSTODY

SAI (by) Issued	Date	Time	Received By (sign)	Date	Time	Received By (sign)	Date	Time
Michael Berthel	12/11/84		Received By Contract Lab (sign)	12/11/84		Received By Contract Lab (sign)	12/11/84	
Shipping Method	12/11/84 14:23:21 574		Carrier From Airport (sign)	Date	Time	Carrier From Airport (sign)	Date	Time



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## SAMPLE SHIPPING RECORD

Shipment No

D-357-6

Page 2 of 2

### CONSIGNEE

Name	Kauck's - Testing
No. Street	
City State Zip	

### SAMPLE ANALYSIS

Sample No	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ex. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanide	TOC	BOD	TSS	VSS	DOC	POC	Oil & Grease	Lipids	Part. Size Dis	Sediment Core Date	Remarks
85 4964	9/11	1400	1	SW003																								
4965			1	SW004																								
4966			1	SW005																								
4967			1	SW006																								
4968			1	SW007																								
4969			1	SW008																								
4970			1	QA11																								
4971			1	SW003																								
4972			1	SW004																								
4973			1	SW005																								
4974			1	SW006																								
4975			1	SW007																								
4976			1	SW008																								
4977			1	QA11																								
Total No. Containers				14																								

### SUBSIDIARY CHAIN OF CUSTODY

Copy	Date	Time	Received By (sign)	Date	Time	Received By (sign)	Date	Time
Michael Butcher	9/11/04							
Copy of Material			Contract From Airport (sign)			Received By Contract Lab (sign)		
Serial #	24312154							

While - SAI      Canary - Lab Representative      Pink - Contract Lab      Goldenrod - Lab Returns to SAI



SCIENCE APPLICATIONS, INC.

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476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

# SAMPLE SHIPPING RECORD

Pg. 10F 2

Shipment No

D-351-8

001527

## CONSIGNEE

Name

KAUCKS TESTING LAB

No. Street

City, State, Zip

ATTN: JIM OWENS

## SAMPLE ANALYSIS

Sample No	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanide	PHENOLS	TOC	TSS	VSS	DOC	POC	Oil and Grease	Lipids	Part. Size Dis	Sediment Core Date	Remarks
85-5185	12/12/15	1500	1	SW001																								H2O ✓
85-5186			1	SW002																								✓
85-5187			1	QA-15																								✓
85-5188			1	QA-16																								✓
85-5189			1	SW001																								✓
85-5190			1	SW002																								✓
85-5191			1	QA-15																								✓
85-5192			1	QA-16																								✓
85-5197			1	SW-001																								✓
85-5198			1	SW-002																								✓
85-5199			1	QA-15																								✓
85-5200			1	QA-16																								✓
85-5201			1	SW-001																								✓
85-5202			1	SW002																								✓
Sub			14																									✓

## SHIPPING CHAIN OF CUSTODY

Shipped By (Sign)	Date	Time	Received By (Sign)	Date	Time	Received By (Sign)	Date	Time	
Michael Busch	12/17	1600				FED EX	12/17	1500	
Shipping Method	Shipped By (Sign)	Date	Time	Received By (Sign)	Date	Time	Received By (Sign)	Date	Time
AIRBILL	024372121								

Whole SAI

Canary Lab Representative

Pack Contract Lab

Goldman Lab Returns to SAI





SCIENCE APPLICATIONS, INC.

DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY

476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

# SAMPLE SHIPPING RECORD

Shipment No.

D-351-8

(D-351-8)

## CONSIGNEE

Name

LAUCKS TESTING LAB

No. Street

City State Zip

ATTN: JIM OWENS

## SAMPLE ANALYSIS

Sample No	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanide	pH	TOC	TSS	VSS	DOC	POC	Oil and Grease	Lipids	Part. Size Dis.	Sediment Core Date	Remarks
85-5089	12/11/88	1330	1	MW0024																							H2O
85-5090			1	MW0025																							
85-5091			1	MW0027																							
85-5092			1	QA-12																							
85-5093			1	QA-13																							
85-5094			1	QA-14																							
85-5107			1	MW0018																							
85-5108			1	MW0019																							
85-5109			1	MW0020																							
85-5110			1	MW0024																							
85-5111			1	MW0025																							
85-5112			1	MW0027																							
85-5113			1	QA-12																							
85-5114			1	QA-13																							
Sub			Total No. Containers	14																							

## SAMPLE CHAIN OF CUSTODY

Date	Time	Received By	Date	Time	Received By
12/11/88		Jim Owens	12/11/88		FED EX



20F3

# SAMPLE SHIPPING RECORD

**SCIENCE APPLICATIONS, INC.**  
 DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY  
 476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

Shipment No  
**D-3518**

## SAMPLE ANALYSIS

**CONSIGNEE**  
 Name LAUCKS TESTING LAB  
 No. Street \_\_\_\_\_  
 City State Zip \_\_\_\_\_

**ATTN. Jim Owens**

Sample No	Sample Date	Packed Time	No. Canisters	Sample Description	Ext. Organics	Sun. Ext. Organics	Vol. Organics	Sun. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	HMWHC	HMWHC	Radionuclides	Drugs	Cyanide	PHENOLS	TOC	TSS	VSS	DOC	PDOC	Oil and Grease	Lipids	Part Size Dis	Sediment Core Date
85-5115	12/11/80		1	GA-14																							
85-5122			1	MW018																							
85-5123			1	MW019																							
85-5124			1	MW020																							
85-5125			1	MW024																							
85-5126			1	MW025																							
85-5127			1	MW027																							
85-5128			1	MWP001																							
85-5129			1	MWP002																							
85-5130			1	MWP003																							
85-5131			1	QA-12																							
85-5132			1	QA-13																							
85-5133			1	QA-14																							
85-5143			1	MW024																							
500																											

**Signature of Shipper**  
Michael Beck Date 12/17/80

**Signature of Recipient**  
AR Dill Date 024372/12/1

**Received By (Contract Lab)**  
FED EX Date 12/17/80

**Received By (Contract Lab)**  
 \_\_\_\_\_ Date \_\_\_\_\_

Where SAI \_\_\_\_\_ Pink Contract Lab \_\_\_\_\_ Goldpoint Lab Returns to SAI \_\_\_\_\_



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### SAMPLE SHIPPING RECORD

30F3

Shipment No

D-3578

#### CONSIGNEE

Name

LAUCKS TESTING LAB

No. Street

City, State, Zip

#### SAMPLE ANALYSIS

ATTN: SIM OWENS

Name LAUCKS TESTING LAB		ATTN: JIM OWENS	
No. Street			
City, State, Zip			

Sample No.	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanide	Phenols	TDC	BOD	TSS	VSS	DOC	POC	Oil and Grease	Lipids	Part. Size Dis.	Sediment Core Date	Remarks
85-5144	10/11	1000	1	MW 025																								H2O ✓	
85-5145			1	MW 027																								✓	
85-5146			1	QA-12																								✓	
85-5147			1	QA-13																								✓	
85-5148			1	QA-14																								✓	



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SAMPLE SHIPPING RECORD

Shipment No

D-351-9

POWER 8

CONSIGNEE

Name  
LAUCKS TESTING LAB

No. Street

City State Zip

SAMPLE ANALYSIS

ATTN: JIM OWENS

Sample No	Sample Date	Picked Up Time	No. Canisters	Sample Description	Ext Organics	Surf Ext Organics	Vol Organics	Surf Vol Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	MMWHC	Radionuclides	Drugs	Storage	PH	TOC	TSN	TSN	POC	Cl and Grease	Slids	Part Size Dis	Sediment Core Date	Refr. Lab
85-5281	12/17	1400	2	SD003																	✓	✓					Sediment
85-5282			2	SD005 004																	✓	✓					
85-5283			2	SD-006 005																	✓	✓					
85-5284			2	SD-007 006																	✓	✓					
85-5285			1	SD-008 007																	✓	✓					
85-5286			2	SD-9 008																	✓	✓					
85-5287			2	SD-10 9																	✓	✓					
85-5288			2	SD-11 10																	✓	✓					
85-5289			1	SD-12 11																	✓	✓					
85-5290			2	SD-12																	✓	✓					
85-5338			2	SW 00-011																	✓	✓					
85-5339			2	SW 00-012																	✓	✓					
85-5340			2	SW 00-013																	✓	✓					
85-5341			2	SW 00-014																	✓	✓					
85-5342			26																		✓	✓					

Date	Time	Received By	Container No.	Date	Time	Received By	Container No.
12/17/88		FED EX		12/17/88		FED EX	

County Lab Representative      Pink Contact Lab      Goldenrod Lab Returns to SAI



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# SAMPLE SHIPPING RECORD

Page 1 of 2

Shipment No

D-351-10

DOVER 10

## CONSIGNEE

Name Javelle Testing Lab

No. Street

City, State, Zip

## SAMPLE ANALYSIS

at the San Juan

Sample No	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Cyanide	pH	TOC	TSS	VSS	DOC	POC	Oil and Grease	Lipids	Par. Size Dis.	Sediment Core Date	Remarks
85-5342	10/10	1500	1																								Water
85-5343			1																								
85-5344			1																								
85-5345			1																								
85-5346			2	2 VIALS PER																							
85-5347			2																								
85-5348			2																								
85-5349			2																								
85-5350			2																								
85-5351			2																								
85-5352			2																								
85-5353			2																								
85-5354			2																								
85-5355			2																								
SUB			24	Total No. Containers																							

## SHIPPING CHAIN OF CUSTODY

SAI (by) (sign)	Date	Time	Received By (sign)	Date	Time
<u>Michael Buehl</u>	10/17	1600	<u>FED EX</u>	10/17	1500
Shipped By (sign)	Date	Time	Received By (sign)	Date	Time
<u>Michael Buehl</u>	10/17	1600	<u>FED EX</u>	10/17	1500
Shipped Method	Date	Time	Received By (sign)	Date	Time
<u>FEDEX</u>	10/17	1600	<u>FED EX</u>	10/17	1500

Goldenrod Lab Returns to SAI

Pink Contract Lab

Canary Lab Representative

White SAI

Pg 2 of 2  
 Shipment No  
 D-351-10  
 COVERED

# SAMPLE SHIPPING RECORD

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 476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456 2791

## attending Owens SAMPLE ANALYSIS

CONSIGNEE  
 Name *Lawrence D. Hastings Lab*  
 No. Street  
 City State Zip

Sample No.	Sample Date	Pack Date	No. Con. Labels	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	CVAR/AC	pH	TOP	TOC	Oil & Grease	Part. Size Dis	Sediment Core Date	Remarks
85-5356	12/17/80		2	2 per Sample																				Sediment
85-5357			2																					Water
85-5358			2																					
85-5359			1																					
85-5360			1																					
85-5361			1																					
85-5362			1																					
85-5363			1																					
85-5364			1																					
85-5365			1																					
85-5366			1																					
85-5367			1																					
85-5368			1																					
Sub			16																					

SHIPPER'S COPY OF CERTIFICATE  
 Name *Michael B. Smith* Date *12/17/80*  
 Title *Lab Manager*  
 Company *AIPL 106243721*  
 Received By (Agent) Date Time  
 Received By (Contact Lab Rep) Date Time  
 Received By (Laboratory) Date Time  
 Received By (Contact Lab Rep) Date Time

Where SAI      Canby Lab Representative      Pick Contract Lab      Goldenrod Lab Returns to SAI



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## SAMPLE SHIPPING RECORD

Pg 1 of 2

Shipment No.

D-351-11

Dover-7-8-9-10

### CONSIGNEE

Name

Laurel Keating Lab

No. Street

City, State, Zip

### SAMPLE ANALYSIS

CONSIGNEE				SAMPLE ANALYSIS														Remarks																		
Name	No. Street	City, State, Zip		Sample No.	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC		HMWHC	Radionuclides	Drugs	Cyanide	PHENOLS	TSS	BOD	VSS	DOC	POC	Oil and Grease	Lipids	Part. Size Dis.	Sediment Core Date				
Laurel Cresting Lab			No. Street	City, State, Zip	85-5208	12/12/00	1000	1	SD-1														✓	✓	✓	✓	✓	✓	✓	✓	✓	Sediment				
					85-5209	7	7	1	SD-2																✓	✓	✓	✓	✓	✓	✓		✓	✓		
					85-5210	7	7	1	QA-17																	✓	✓	✓	✓	✓	✓		✓	✓	✓	
					85-5211	12/12/00	1000	1	SD009																	✓	✓	✓	✓	✓	✓		✓	✓	✓	
					85-5212	7	7	1	SD010																	✓	✓	✓	✓	✓	✓		✓	✓	✓	
					85-5213	7	7	1	SD011																	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
					85-5214	7	7	1	SD012																	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
					85-5215	12/12/00	1000	1	SD003																	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
					85-5216	7	7	1	SD004																	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
					85-5217	7	7	1	SD005																	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
					85-5218	7	7	1	SD006																	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
					85-5219	7	7	1	SD007																	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
					85-5220	7	7	1	SD008																	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
					85-5221	12/12/00	1000	1	SD-17																	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓

### SHIPPING CHAIN OF CUSTODY

SAI (by) (sign)		Date	Time	Received By (sign)		Date	Time	Received By (sign)		Date	Time
Michael Beckel		12/20	3:30					Federal Express		12/20	13:30
Shipping Method		Shipped By (sign)		Courier From: Airport (sign)		Date	Time	Received By Contract Lab (sign)		Date	Time
FedEx		Michael Beckel									

White SAI

Canary Lab Representative

Pink Contract Lab

Goldenrod Lab Returns to SAI



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# SAMPLE SHIPPING RECORD

Pg 2052

Shipment No

D-351-11

## CONSIGNEE

Name

Laufer Testing Lab

No. Street

City State Zip

## SAMPLE ANALYSIS

Sample No.	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Chloride	pH	TOC	BOD	SS	VSS	DOC	POC	Oil and Grease	Lipids	Part. Size Dis.	Sediment Core Date	Remarks
85-5386	12/14/85	1300	1	SD-19																							Sediment
85-5391	12/13/85	1300	1	SL-13																							
85-5392			1	SL-14																							
85-5393			1	SL-15																							
85-5394			1	SL-16																							
85-5395			1	QA-20																							
85-5396			1	SD-020																							
85-5397			1	SD-021																							
85-5398			1	SD-022																							
85-5399			1	SD-023																							
85-5400			1	SD-024																							
85-5401			1	SD-025																							
85-5402			1	SD-026																							
85-5403			1	SD-027																							
85-5404			14																								

Received By	Date	Time	Received By	Date	Time
Michael Bechtel	12/20/85	1:30	Michael Bechtel	12/20/85	1:30

Whole SAI      Canary Lab Representative      Pink Contract Lab      Goldenrod Lab Returns to SAI







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# SAMPLE SHIPPING RECORD

Shipment No. Don 1

Vol 10 - 3

## CONSIGNEE

Name E. J. Tokarski / JRB  
No. Street 8400 WESIPARK DR  
City, State, Zip LA JOLLA CA 92038

## SAMPLE ANALYSIS

Sample No	Sample Date	Picked Time	No. Con. Containers	Sample Description	Ext. Organics	Sur. Ext. Organics	Vol. Organics	Sur. Vol. Organics	Trace Metals	Other Inorganics	Hydroxides	LMWHC	LMWHC	Radionuclides	Drugs	Chloride	PH	TDC	BOD	TSS	VSS	DOC	POC	Oil and Grease	Remarks
10010	11/19	1300	10	MW-10 AT SITE 4 - GROUND WATER	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	TOX
10011	11/19	1350	10	MW-11 AT SITE 4 - GROUND WATER	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	TOX
10012	11/19	1410	10	MW-12 AT SITE 4 - GROUND WATER	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	TOX
QA 1	11/19	1500	10	QA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	TOX
QA 2	11/19	1500	10	QA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	TOX
QA 3	11/19	1500	10	QA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	TOX

SHIPPING CHARGE OF CUSTOMER

SAI by 11/19/83

Shipping Method 11/19/83

Shipped By (sign)

Date

Received By (sign)

Date

Consent By Courier (sign)

Date

Time

White SAI

Canary Lab Representative

Black Canary Lab

Goldenrod Lab. Return to SAI



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476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 466-2791

SAMPLE SHIPPING RECORD

Shipment No.

DW-2

CONSIGNEE

Name: ED TOKMASKI  
No. Street: 8400 WESTVIEW DR  
City, State, Zip: MCLEAN VA 22102

SAMPLE ANALYSIS

Sample No.	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LAMWMC	HAMWMC	Radionuclides	Drugs	Cyanide	pH	TOC	BOD	TSS	CO <sub>2</sub>	Remarks
MW013	11/30	1000	10	SITZ 4 - MW013 - G.W.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	VERY STRONG ODOR
MW023	11/30	1045	10	SITZ 5 - MW023 - G.W.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Q-4	11/30	1000	10	QA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
MW012	11/30	1130	10	SITZ 5 - MW012 - G.W.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
MW021	11/30	1230	10	SITZ 5 - MW021 - G.W.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Q15	11/30	1300	10	QA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
2 Containers																							
TOTAL																							

Total No. Containers

SHIPPING CHAIN OF CUSTODY

SAI (Sign)	Date	Time	Received By (Sign)	Date	Time	Received By (Sign)	Date	Time
SAI (Sign)	11/30	1130	Ed Tokmaski	12/1	1015	Ed Tokmaski	12/1	1015
Shipping Method	Truck		Shipped By (Sign)			Received By Contract Lab (Sign)		
SAI (Sign)								



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## SAMPLE SHIPPING RECORD

Shipment No.

476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 458-2791

**CONSIGNEE**

Name Tokidoki - TAB  
EP

No. Street  
8100 WEST WALK DA

City, State, Zip HOLLYMAN VA 22002

## SAMPLE ANALYSIS

Name				Sample No.				Sample Description				Remarks															
ED TOKUSHI - TAB																											
No. Street																											
38100 WEST AVE																											
City, State, Zip																											
MCLAN VA 22021																											
Sample No.	Sample Date	Picked Time	No. Containers	Sample Description										Remarks													
MUP05	12/6	0815	2	LOW, XSEAL MUP5										Heavy soils Small in the Heavy soils Small in the													
MUP06	12/6	0825	2	" " " MUP6																							
MUP07	12/6	0930	2	" " " MUP7																							
MUP08	12/6	0930	2	" " " MUP8																							
MUP09	12/6	1015	10	" " " MUP9																							
MUP10	12/6	1104	10	" " " MUP10																							
MUP11	12/6	1130	10	" " " MUP11																							
MUP12	12/6	1407	10	" " " MUP12										Known High Soils organic Known High Soils organic Known High Soils organic													
MUP13	12/6	1500	10	" " " MUP13																							
QA 8	12/6	1530	10	" " " QA 8																							
QA 9	12/6	0825	10	" " " QA 9																							
QA 10	12/6	1130	10	" " " QA 10										Asside High Soils organic													

### SHIPPING CHAIN OF CUSTODY

Shipping Method	Shipped By (Name)
92 Express	1-10-27

Date	Time	Received By (sign)	Courier From Airport (sign)
2/6/81			

Date	Received By Courier (sign)
Date	Received By Contract Lab (

Received By Courier (sign)	Date	Time
Received By Contract Lab (sign)	Date	Time





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476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

# SAMPLE SHIPPING RECORD

Shipment No.

Dover 6

357-8

## CONSIGNEE

Name: Ed Tokarski - JR  
No. Street: 8400 Westlake Dr  
City, State, Zip: Rye, VA 2210

## SAMPLE ANALYSIS

Name Ed Tokarski - JR				No. Street 8400 Westlake Dr				City, State, Zip Arlington VA 22102				Sample Description																							
Sample No.	Sample Date	Picked Time	No. Containers											Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	NMWHC	Organic Phosphates	PCBs	Organics	TDC	BOD	TSS	VSS	DOC	POC	Remarks		
MW 018	12/11	0900	4	GW 120m FT-3																							X							X	
MW 019	12/11	0930	4	GW " FT-3																							X							X	
MW 020	12/11	1000	4	GW " FT-3																							X							X	
MW 024	12/11	1030	11	GW " S-1																							X							X	
MW 025	12/11	1100	11	GW " S-1																							X							X	
MW 027	12/11	1130	11	GW " S-1																							X							X	
MW 001	12/11	1300	2	GW "																							X							X	
MW 002	12/11	1330	2	GW "																							X							X	
MW 003	12/11	1400	2	GW "																							X							X	
QA-12	12/11	0830	11	QA																							X							X	
QA-13	12/11	0830	11	QA																							X							X	
QA-14	12/11	1430	11	QA																							X							X	

## SHIPPING CHAIN OF CUSTODY

SAI (by hand)	12/11	1430	X	12/11/2000	Received By (sign)	Date	Time	Received By Courier (sign)	Date	Time	Received By Contract Lab (sign)	Date	Time
Shipped Method	12/11	1430	X	12/11/2000	Received By (sign)	12-10-54	1400	Received By Contract Lab (sign)	12-10-54	1400	Received By Contract Lab (sign)	12/12/00	1100



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INTERNATIONAL CORPORATION

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SAMPLE SHIPPING RECORD

Shipment No.

Dover 7

Ag - 857-275X 351-8

CONSIGNEE

Name  
ED TOKARSKI  
No. Street  
8400 WEST 112TH AVE.  
City, State, Zip  
MILWAUKEE, WI 53222

SAMPLE ANALYSIS

Name ED TOKARSKI				No. Street 8400 WEST 142ND PL.				City, State, Zip MILWAU WI 53224				Sample No.		Sample Date	Packed Time	No. Containers	Sample Description															Ext. Organics		Surv. Ext. Organics		Vol. Organics		Surv. Vol. Organics		Trace Metals		Other Inorganics		Pesticides		Herbicides		LMWHC		HMWHC		Radionuclides		Cyanide		TOC		TSS		VSS		DOC		POC		Remarks																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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SHIPPING CHAIN OF CUSTODY

Signature	Date	Time	Received By (sign)	Date	Time	Received By (sign)	Date	Time
SAI (by sign)	12/12/00	1200	Received By (sign)	12/13/00	1200	Received By (sign)	12/13/00	1200
Shipping Method	Ex		Courier From Airport (sign)	12-13-00	1200	Received By (sign)	12/13/00	1200

copy to Lab Review



SCIENCE APPLICATIONS  
INTERNATIONAL CORPORATION

DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY  
476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 458-2791

# SAMPLE SHIPPING RECORD

Shipment No.

10008

## CONSIGNEE

Name Ed TOKARSKI - J03

No. Street

8400 WEST PARK

City, State, Zip

MIRIAM VA

## SAMPLE ANALYSIS

Name Ed TOKANSKI - J03																									
No. Street 8400 WEST PARK																									
City, State Zip MURKIN VA																									
Sample No.	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Toxic Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanide	TDC	BOD	TSS	VSS	DOC	POC	Remarks	
SW 011	12/12	1200	4	FT-3 STREAM																					TOT water not ready
SW 012	12/12	1630	4	FT-3 STREAM																					
SW 013	12/12	1600	4	FT-3 STREAM																					
SW 014	12/12	1530	4	FT-3 STREAM																					
SD 009	12/12	1700	4	FT-3 Sed / SW011																					
SD 010	12/12	1630	4	FT-3 Sed / SW012																					
SD 011	12/12	1600	4	FT-3 Sed / SW013																					
SD 012	12/12	1530	4	FT-3 Sed / SW014																					

## SHIPPING CHAIN OF CUSTODY

SAI (by sign)	Date	Time	Received By (sign)	Date	Time	Received By Courier (sign)	Date	Time
<u>[Signature]</u>	<u>12/12/12</u>	<u>1800</u>	<u>[Signature]</u>	<u>12/14</u>	<u>1100</u>	<u>[Signature]</u>	<u>12/14</u>	<u>1100</u>
Shipping Method	Shipped By (sign)		Courier From Airport (sign)	Date	Time	Received By Contract Lab (sign)	Date	Time
<u>Fed X</u>	<u>[Signature]</u>		<u>[Signature]</u>	<u>12/14</u>	<u>1100</u>	<u>[Signature]</u>	<u>12/14</u>	<u>1100</u>





SCIENCE APPLICATIONS  
INTERNATIONAL CORPORATION

DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY  
476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

SAMPLE SHIPPING RECORD

TOM - 201

Shipment No.  
**DOX 8**

CONSIGNEE

Name **ED TCHARKSKI/JRB ASSOCIATES**  
No. Street **21404 WILFORD PARK**  
City State Zip **MILLICAN, VA 22102**

SAMPLE ANALYSIS

Client Information					Sample Description	Remarks																			
Name	No. Street	City	State	Zip		Ext. Organics	Sun. Ext. Organics	Vol. Organics	Sun. Vol. Organics	Trace Metals	Other Inorganics	Herbicides	LMWHC	HMWHC	PCBs	TOC	DOC	TSS	VSS	DOC	POC	Oil and Grease	Alkalinity	Acidity	Sediment Core Date
ERSTEKARSKI/JRB ASSOCIATES	81406 WILF PARK 1E	MILWAUKEE	WI	53208																					
50008	1/10/84	2:14	4	SEDIMENT SAMPLE					X						X										
50007	1/10/84	2:42	4	SEDIMENT SAMPLE					X						X										
50006	1/10/84	2:42	4	SEDIMENT SAMPLE					X						X										
50005	1/10/84	2:42	4	SEDIMENT SAMPLE					X						X										
50004	1/10/84	2:42	4	SEDIMENT SAMPLE					X						X										
50003	1/10/84	2:42	4	SEDIMENT SAMPLE					X						X										

all Hg

*all Hg*

Total No. Containers

SHIPPING CHAIN OF CUSTODY

SAI (By) (sign)	Date	Time	Received By (sign)	Date	Time
	12-14	11:00	Received By (sign)	12-14	11:00
Shipping Method	Supplied By (sign)		Courier From Airport (sign)	Date	Time
	Fed X		B. STUBBS	12-14	11:00
			Received By Contract Lab (sign)	Date	Time
			Michael H. Barkley	12-14	11:00



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DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY  
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# SAMPLE SHIPPING RECORD

Shipment No.  
**DUER-10**

CONSIGNEE			SAMPLE ANALYSIS	
Name	No. Street	City, State, Zip	Sample No.	Sample Description
<b>ED TOKHAKI</b>	<b>8400 WESTPARK</b>	<b>RICHLAND WA</b>	<b>SP220</b>	<b>D-2 Sub</b>
			<b>SD020</b>	<b>D-2</b>
			<b>SD021</b>	<b>D-2</b>
			<b>SD022</b>	<b>D-2</b>
			<b>SD023</b>	<b>D-2</b>
			<b>SD024</b>	<b>D-2</b>
			<b>SD025</b>	<b>D-2</b>
			<b>SD026</b>	<b>D-2</b>
			<b>SD027</b>	<b>D-2</b>
			<b>Total No. Containers</b>	<b>36</b>
SHIPPING CHAIN OF CUSTODY				
SAI (M) (Sign)	Date	Received By (Sign)	Date	Time
<b>J. J. [Signature]</b>	<b>12/19/80</b>	<b>[Signature]</b>	<b>12/19/80</b>	<b>1300</b>
Shipping Method	Shipped By (Sign)	Received By (Sign)	Date	Time
<b>SAI (M) (Sign)</b>	<b>[Signature]</b>	<b>[Signature]</b>	<b>12/19/80</b>	<b>1300</b>

Ext. Organics

Vol. Organics

Surv. Vol. Organics

Toxic Metals

Other Inorganics

Pesticides

Herbicides

LAMVHC

HAMVHC

Radionuclides

Drugs

Cyanides

PH

TOC

TSS

VBS

DOC

POC

OR and

Remarks



SCIENCE APPLICATIONS, INC.

DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY  
476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

# SAMPLE SHIPPING RECORD

Shipment No.

100210

## CONSIGNEE

Name: DR. J. R. B.  
No. Street: 1111  
City, State, Zip: LA JOLLA, CA 92038

## SAMPLE ANALYSIS

Sample No.	Sample Date	Package No.	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanides	TDC	H.C. 37-10	TSS	VSS	DOC	POC	Oil and Grease	Remarks
W-00016	12/14	2	1000	WATER																					
W-00017	12/14	2	1000	WATER																					
W-00019	12/14	2	1000	WATER																					
W-00020	12/14	4	1000	WATER																					
W-00021	12/14	4	1000	WATER																					
W-00022	12/14	4	1000	WATER																					
W-00023	12/14	3	1100	WATER																					
W-00024	12/14	3	1100	WATER																					
W-00025	12/14	1	1100	WATER																					
W-00026	12/14	1	1100	WATER																					
W-00027	12/14	1	1100	WATER																					
W-00028	12/14	1	1100	WATER																					
W-00029	12/14	1	1100	WATER																					
W-00030	12/14	1	1100	WATER																					
Total No. Containers																									

## SHIPPING CHAIN OF CUSTODY

SAI (by)	Date	Time	Received By (sign)	Date	Time
SAI (by)	12/14	12:00	Received By (sign)	12/14	12:00
Shipping Method	Shipped By (sign)		Courier From Airport (sign)	Date	Time
SAI (by)	12/14	12:00	SAI (by)	12/14	12:00

# SAMPLE SHIPPING RECORD

**SCIENCE APPLICATIONS  
INTERNATIONAL CORPORATION**

**DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY**  
**476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 458-2791**

Shipment No.

Door 11

[illegible]



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476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

# SAMPLE SHIPPING RECORD

D-351  
AT 1753  
Shipment No  
1000-3

## CONSIGNEE

Name *Charles Tech Inc.*  
No. Street *3018 St.*  
City, State, Zip *National City, Ca.*

## SAMPLE ANALYSIS

Sample No	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanide	pH	TOC	BOD	TSS	VSS	DOC	POC	Oil and Grease	Lids	Part. Solids	Sediment Core Date	Remarks
85-4574	12/5	1500	4	MW010																									
4575			4	MW011																									
4576			4	MW012																									
4577			4	MW013																									
4578			4	MW 021																									
4579			4	MW 022																									
4580			4	MW 023																									
4581			4	QA1																									
4582			4	QA2																									
4583			3	QA3																									
4584			4	QA4																									
4585			4	QA5																									
			Total No. Containers	49																									

## SHIPPING CHAIN OF CUSTODY

Signature (sign)	Date	Time	Received By (sign)	Date	Time
<i>Charles Tech Inc.</i>	12/11/1500				
Signature (sign)	Date	Time	Received By (sign)	Date	Time
<i>Charles Tech Inc.</i>	12/11/1500				



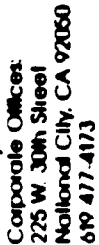
Analytical Technologies, Inc.

Corporate Office:  
225 W. 30th Street  
New York City, CA 92060  
619-477-4173

# Chain of Custody Record

pg 1/2

PROJECT NO.	PROJECT NAME	SAMPLE TYPES											OTHER	NUMBER OF CONTAINERS	REMARKS
		General Inorganic	Metals	Nutrients	Oil & Grease	Cyanide	Organics	Solids-Inorganics	Volatile Organics	Fuel	Oil	Industrial Hygiene			
1753	Science Applications														
SAMPLERS: (Signature)															
ATJ #															
STATION NUMBER	DATE	TIME	STATION LOCATION												
1			85-4544 MW010												601 & 602
2			-4545 MW011												
3			-4546 MW012												
4			-4547 MW013												
5			-4548 MW021												
6			-4549 MW022												
7			-4550 MW023												
8			-4551 QA 1												
9			-4552 QA 2												
10			-4553 QA 3												
			TOTAL NUMBER OF CONTAINERS												
RELINQUISHED BY: (Signature)			DATE/TIME		RECEIVED BY: (Signature)		DATE/TIME		RELINQUISHED BY: (Signature)		DATE/TIME		RECEIVED BY: (Signature)		
RELINQUISHED BY: (Signature)			DATE/TIME		RECEIVED BY: (Signature)		DATE/TIME		RELINQUISHED BY: (Signature)		DATE/TIME		RECEIVED BY: (Signature)		
METHOD OF SHIPMENT:			DATE/TIME		SHIPPED BY: (Signature)		DATE/TIME		COURIER: (Signature)		DATE/TIME		RECEIVED FOR LAB BY: (Signature)		



pg 2/2-

**DISTRIBUTION:** Original accompanies shipment. Copy to field files.



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INTERNATIONAL CORPORATION

DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY

476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2781

SAMPLE SHIPPING RECORD

AT # 1772

Shipment No.  
D 851-5

CONSIGNEE

Name  
*Chemical Techno.*  
No. Street  
*201 St.*  
City, State, Zip  
*Norwood, CA*

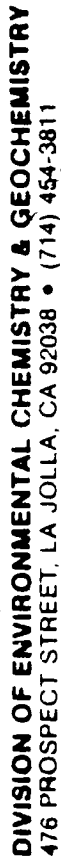
SAMPLE ANALYSIS

Name <i>Analytical Technicians</i>			City, State, Zip <i>2014 St. Nashua, NH</i>			Sample No.		Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics Surv. Ext. Organics Vol. Organics Surv. Vol. Organics Trace Metals Other Inorganics Pesticides Herbicides LMWHC HMWHC Radionuclides Drugs Cyanide pH TDC BOD TSS VSS DOC POC Oil and Grease Shipment Date																				Remarks																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
85-482A		4830	12/11/80		4	MW001																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											</

SHIPPING CHAIN OF CUSTODY

SAI (by) (sign)	Date	Time	Received By (sign)	Date	Time
<i>David L. [Signature]</i>	12/11	1300			
Shipping Method	Shipped By (sign)	Date	Courier From Airport (sign)	Date	Time
<i>Co.</i>	<i>David L. [Signature]</i>			12/11	145





## Shipment No

D-351 12

For a while,

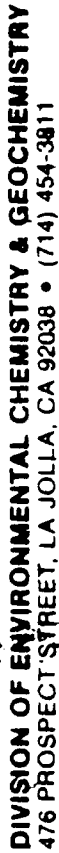
Name Anthony J. Zeb  
No. Street \_\_\_\_\_  
City State Zip \_\_\_\_\_

[illegible]

# ADULTERY, CUSTODY

Received By (sign)	Date	Time	Received By (sign)	Date	Time
<i>Joey L. Caro</i>	12/17/77	10:30h	<i>Joey L. Caro</i>	12/17/77	10:30h
<i>Joey L. Caro</i>	12/17/77	10:30h	<i>Joey L. Caro</i>	12/17/77	10:30h

<b>White - SAI</b>	<b>Canary - Lab Representative</b>	<b>Pink - Contract Lab</b>	<b>Goldenrod - Lab Returns to SAI</b>
--------------------	------------------------------------	----------------------------	---------------------------------------



## Shipment No

D 357-12

## Goldenrod-Lab Returns to SAI



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## SAMPLE SHIPPING RECORD

Shipment No

D-351-1

8124

### CONSIGNEE

Name

Laucks Testing Labs

No. Street

City State Zip

at Joe Duxie

### SAMPLE ANALYSIS

Sample No	Sample Date	Package Time	No. Con- tainers	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanide	TOC	BOD	TSS	VSS	DOC	POC	Oil & Grease	Lipids	Part Size Dis	Sediment Core Date	Remarks
85-4512	1/30		1	MW-023																								
4513	1/29		1	QA1																								
4514			1	QA2																								
4515			1	QA3																								
4516	1/30		1	QA4																								
4517			1	QA5																								
4518			1	Barley Wash																								
4519			1	Trillium Blank																								
4520	1/29		1	MW-010																								
4521			1	MW-011																								
4522			1	MW-012																								
4523	1/30		1	MW-013																								
4524			1	MW-021																								
4525	1/29		1	MW-022																								
Total No. Containers				142	WATERS																							

FOR PROCEEDING OF CUSTODY

Signature	Date	Time	Received By (sign)	Date	Time	Received By (sign)	Date	Time
Michael K. Berch	1/29	1500	Federal Express	1/29	1500			
Signature	Date	Time	Received By (sign)	Date	Time	Received By (sign)	Date	Time
			Contract From Airport (sign)			Received By Contract Lab (sign)		

White - SAI    Canary - Lab Representative    Pink - Contract Lab    Goldenrod - Lab Returns to SAI



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476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

## SAMPLE SHIPPING RECORD

Shipment No.  
**A-351-1**

**Page 2 of 4**

### CONSIGNEE

Name **Laucks Testing Labs**

No., Street

City, State, Zip

**Attn: Jim Owens**

### SAMPLE ANALYSIS

Sample No.	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanide	TOC	Therapies	TSS	VSS	DOC	POC	Oil and Grease	Leads	Part. Size Dist.	Sediment Core Date	Remarks
85-4506	11/29		1	MW-010																								
4507			1	MW-011																								
4508			1	MW-012																								
4509	11/30		1	MW-013																								
4510			1	MW-021																								
4511			1	MW-022																								
4526			1	MW-023																								
4527	11/29		1	QA1																								
4528			1	QA2																								
4529			1	QA3																								
4530	11/30		1	QA4																								
4531			1	QA5																								
4586	11/29		1	MW-010																								
4587	11/29		1	MW-012																								
Total No. Containers				14	WATERS																							

### SHIPPING CHAIN OF CUSTODY

SAI (by) (sign)	Date	Time	Received By (sign)	Date	Time	Received By (sign)	Date	Time
<b>Mutand Backel</b>	11/29	1500	<b>Federal Express</b>	11/29	1500	<b>Contract Lab</b>		
Shipping Method	Shipped By (sign)		Received By Contract Lab (sign)		Received By Contract Lab (sign)		Received By Contract Lab (sign)	



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476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

## SAMPLE SHIPPING RECORD

Shipment No.

D-351-1

Pg. 4 of 4

### CONSIGNEE

Name

Lauck's Testing Labs

No. Street

City State Zip

### SAMPLE ANALYSIS

Sample No.	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanide	pH	TDC	Ben. Phenols	TSS	VSS	DOC	POC	Oil and Grease	Lixids	Part. Size Dis.	Sediment Core Date
85-4588	11/29		1	MW-013																							
4589	11/30		1	MW-021																							
4590			1	MW-022																							
4591			1	MW-023																							
4592	11/20		1	QA1																							
4593	11/29		1	QA2																							
4594	11/29		1	QA3																							
4595	11/30		1	QA4																							
4596	11/30		1	QA5																							
Total No. Containers				9	WATERS																						

SHIP FROM CHAIN OF CUSTODY

Signature	Time	Date	Received By (sign)	Time	Date	Received By (sign)	Time	Date
Mechanick	12:40	12/4	Ed. Examen	15:00	12/4			
Shipping Method	Shipped By (sign)		Counter From Airport (sign)			Received By Contract Lab (sign)		



SCIENCE APPLICATIONS  
INTERNATIONAL CORPORATION

DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY  
476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

## SAMPLE SHIPPING RECORD

Shipment No.

0-351-1

Pg 3 of 4

### CONSIGNEE

Name

Lauck's Testing Labs

No., Street

City, State, Zip

### SAMPLE ANALYSIS

Name <u>Lauck's Testing Labs</u>		City, State, Zip		Name <u>Allen Tim Onizels</u>		Sample Description		Ext. Organics		Surv. Ext. Organics		Vol. Organics		Surv. Vol. Organics		Trace Metals		Other Inorganics		Pesticides		Herbicides		LMWHC		HMWHC		Radionuclides		Drugs		Cyanide		pH		TOC		BOD		TSS		VSS		DOC		POC		Oil and Grease		Lipids		Part. Size Dis.		Sediment Core Date		Remarks																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Sample No.	Sample Date	Packed Time	No. Containers																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						

Total No. Containers

449 WATERS

### SHIPPING CHAIN OF CUSTODY

SAI (by)	Signature	Date	Time	Received By (sign)	Date	Time	Received By (sign)	Date	Time
	M. Beuch	11/14	10:00	Kenn Federal Express	11/14	10:00			
Shipping Method	Shipped By (sign)			Courier From Airport (sign)			Received By Contract Lab (sign)		



SCIENCE APPLICATIONS  
INTERNATIONAL CORPORATION

DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY  
476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456 2791

## SAMPLE SHIPPING RECORD

Shipment No.

0-351-2

pg 1 of 3

### CONSIGNEE

Name Lucks Testing Lab  
No. Street \_\_\_\_\_  
City State Zip \_\_\_\_\_

### SAMPLE ANALYSIS

Name Lucks Testing Lab			City State Zip		Sample No		Sample Description		Alt. Tim Quicks		Analysis																								Remarks
No Street																																			

### SHIPPING CHAIN OF CUSTODY

Shipped By (sign)	Time	Received By (sign)	Date	Time	Received By (sign)	Date	Time
<u>Michael Bechtel</u>	1:15	<u>P</u>			<u>Federal Express</u>		
Shipped Met at		Counter From Airport (sign)	Date	Time	Received By Contract Lab (sign)	Date	Time
<u>AB 069 287023</u>							



# SAMPLE SHIPPING RECORD

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INTERNATIONAL CORPORATION

DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY  
476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

Shipment No

0-351-2

pg 2 of 3

## CONSIGNEE

Name

Lucks Testing Lab

No. Street

City, State, Zip

Allen Jim Overb

## SAMPLE ANALYSIS

Sample No.	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Phenols	TOX	TOC	BOD	TSS	VSS	DOC	POC	Oil and Grease	Lipids	Part. Size Dis	Sediment Core Date	Remarks
85-4621	10/5/84	1400	1	mw008																									
4622			1	mw009																									
4623			1	mw014																									
4624			1	mw015																									
4625			1	mw016																									
4626			1	mw017																									
4627			1	QA6																									
4628			1	QA7																									
4640			1	mw005																									
4641			1	mw006																									
4642			1	mw007																									
4643			1	mw008																									
4644			1	mw009																									
4645			1	QA6																									
Total No. Containers				14																									

## SHIPPING CHAIN OF CUSTODY

SAIL (sign)	Michael Bruch	Date	Time	Received By (sign)	Date	Time	Received By Courier (sign)	Date	Time
Shipping Method	APR 01 09 22 10 23			Courier From Airport (sign)	Date	Time	Received By Contract Lab (sign)	Date	Time
				Federal Express					





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INTERNATIONAL CORPORATION

DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY  
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## SAMPLE SHIPPING RECORD

Shipment No  
0-351-2

pg 3 of 3

### CONSIGNEE

Name  
Lauviks Testing Lab

No Street

City State Zip

### SAMPLE ANALYSIS

Name Darius Testing Lab					City State, Zip					Name Allen Tia Ouedra		Sample Description		Remarks									
No Street																							
Sample No					Sample Date					Packed Time					No. Containers					Total No. Containers			
85-4646					13/5/84					1400					1					QA7			
85-4647															1					mw 005			
4648															1					mw 006			
4649															1					mw 007			
4650															1					mw 008			
4651															1					mw 009			
4652															1					QA6			
4653															1					QA7			

### SHIPPING CHAIN OF CUSTODY

Shipped By (sig)	Date	Time	Received By (sig)	Date	Time
Michael Beckel			Federal Express		
Shipped By (sig)	Date	Time	Received By (sig)	Date	Time
AB# 069 227073					

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## SAMPLE SHIPPING RECORD

Shipment No

N-351-3

Fi-351-11

CONSIGNEE	Name	No	Street	City	State	Zip
			LAUCKS TESTING LAB			

Animal, 17 M OLYEAS

[illegible]

SHIPPING CHAIN OF CUSTODY			
SAI (by) (sign)	Date	Time	
<i>M. Beckel</i>	12/10		
Shipping Method	Shipped By (sign)		
	12/10 034372110		
	Received By (sign)	Date	Time
	Received By Courier (sign)	Date	Time
	<i>FED EX</i>	12/10	1500
	Received By Contract Lab (sign)	Date	Time

White - SAI	Canary - Lab Representative	Pink - Contract Lab	Goldenrod - Lab Returns to SAI
-------------	-----------------------------	---------------------	--------------------------------



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## SAMPLE SHIPPING RECORD

8 20F 3

Shipment No  
N-351-3

### CONSIGNEE

Name  
LAUCKS TESTING LAB

No. Street

City State Zip

### SAMPLE ANALYSIS

Consignee No.	Sample Date	Placed in Container	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanide	pH	TOC	BOD	TSS	VSS	POC	Oil & Grease	Lipids	Part. Size Dis	Sediment Core Date	Remarks
85-4781	10/6/00	1	MW 003																								Agm
85-4782		1	MW 004																								
85-4783		1	MW 101																								
85-4784		1	MW 102																								
85-4785		1	MW 103																								
85-4786		1	QA 8																								
85-4787		1	QA 9																								
85-4788		1	QA 10																								
85-4789		1	MW 001																								
85-4790		1	MW 002																								
85-4791		1	MW 004																								
85-4792		1	MW 101																								
85-4793		1	MW 102																								
85-4794		1	MW 103																								
85-4795		14																									

Received By (Sign)	Date	Time	Received By (Sign)	Date	Time
FEDEX	10/10	1500			
Contract From Airport (Sign)					

White - SAI      Canary - Lab Representative      Pink - Contract Lab      Goldenrod - Lab Returns to SAI



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## SAMPLE SHIPPING RECORD

pg 3 of 3

Shipment No

N-3513

### CONSIGNEE

Name

LAUCKS TESTING LAB

No Street

City State Zip

### SAMPLE ANALYSIS

Sample No	Sample Date	Packed Time	No Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanide	Phenols	TOC	BOD	TSS	VSS	DOC	POC	Oil & Grease	Lipids	Part. Size Dis.	Sediment Core Date	Remarks
85-4785	12/6	1000	1	QA 8																									Agg
85-4796			1	QA 9																									
85-4797			1	QA 10																									
85-4820			1	MW001																									
85-4821			1	MW002																									
85-4822			1	MW004																									
85-4823			1	MW101																									
85-4824			1	MW102																									
85-4825			1	MW103																									
85-4826			1	QA 8																									
85-4827			1	QA 9																									
85-4828			1	QA 10																									
Sub			Total No Containers	12																									

### SHIPPING CHAIN OF CUSTODY

SAI (by sign)

Shipped By (sign)

Shipping Method

Date

Time

Date

Time

Received By (sign)

Received By (sign)

Received By (sign)

Received By (sign)

Date

Time

Date

Time

Received By Courier (sign)

Received By Courier (sign)

Received By Courier (sign)

Received By Courier (sign)

Date

Time

Date

Time

White - SAI

Canary - Lab Representative

Pink - Contract Lab

Goldenrod - Lab Returns to SAI



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## SAMPLE SHIPPING RECORD

Shipment No.

D357-6

pg 1032

### CONSIGNEE

Name Lauks Testing  
No. Street  
City, State, Zip

Attn: Jim Owen

### SAMPLE ANALYSIS

Sample No	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Phenol	Cyanide	TDC	BOD	TSS	VSS	DOC	POC	Oil and Grease	Lipids	Part. Str. Dis.	Sediment Core Date	Remarks
4935	12/11	1400	1	SW003																								
4938			1	SW004																								
4939			1	SW005																								
4940			1	SW006																								
4941			1	SW007																								
4942			1	SW008																								
4943			1	QA 11																								
4951			1	SW003																								
4952			1	SW004																								
4953			1	SW005																								
4954			1	SW006																								
4955			1	SW007																								
4956			1	SW008																								
4957			1	QA 11																								
Total No. Containers				14																								

### SHIPPING CHAIN OF CUSTODY

SAI (by) (sig)	Date	Time	Received By (sig)	Date	Time	Received By (sig)	Date	Time
<u>Michael Berber</u>	12/11/84		<u>Jim Owen</u>	12/11/84		<u>Jim Owen</u>	12/11/84	
Shipping Method	Truck # 24372154		Counter From Airport (sig)			Received By (Contract Lab (sig))		



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## SAMPLE SHIPPING RECORD

Shipment No

D-357-6

Pg 2 of 2

### CONSIGNEE

Name	Laucks Testing
No. Street	
City State Zip	

Attn: Tim Owens

### SAMPLE ANALYSIS

Sample No	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanide	TOC	BOD	TSS	VSS	DOC	POC	Oil & Grease	Lipids	Part. Size Dis.	Sediment Core Date	Remarks
85 4964	12/11/84	1400	1	S60003														✓										
4965			1	S62004														✓										
4966			1	S60005														✓										
4967			1	S60006														✓										
4968			1	S60007														✓										
4969			1	S60008														✓										
4970			1	QA11														✓										
4971			1	S60003														✓										
4972			1	S60004														✓										
4973			1	S60005														✓										
4974			1	S60006														✓										
4975			1	S60007														✓										
4976			1	S60008														✓										
4977			1	QA11														✓										
Total No. Containers				14																								

### SHIPPING CHAIN OF CUSTODY

SAI (sign)	Michael Bechtel	Date	12/11/84	Time		Received By (sign)		Date		Time		Received By (sign)	Pat Ex	Date	12/11/84	Time	1500
Shipping Method	Air Mail # 2437254	Shipped By (sign)				Courier From: Airport (sign)		Date		Time		Received By Contract Lab (sign)		Date		Time	

White - SAI

Canary - Lab Representative

Pink - Contract Lab

Goldenrod - Lab Returns to SAI

# SAMPLE SHIPPING RECORD

**SCIENCE APPLICATIONS, INC.**  
 DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY  
 476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

Shipment No  
**D-381-8**  
 001227

## SAMPLE ANALYSIS

ATTN: JIM OWENS

CONSIGNEE  
 Name **LAUCKS TESTING LAB**  
 No Street  
 City State Zip

CONTRACT				Name		City State Zip		ATTN: JIM OWENS	
LAUCKS TESTING LAB				No. Street					
Sample No				Sample Date		Packed Date		No. Containers	
85-5185	12/12	1500	1	SW001					
85-5186			1	SW002					
85-5187			1	QA-15					
85-5188			1	QA-16					
85-5189			1	SW001					
85-5190			1	SW002					
85-5191			1	QA-15					
85-5192			1	QA-16					
85-5193			1	SW-001					
85-5194			1	SW-002					
85-5199			1	QA-15					
85-5200			1	QA-16					
85-5201			1	SW-001					
85-5202			1	SW002					
85-5203			14	SUB					

Ext. Organics	Surf. Ext. Organics	Vol. Organics	Surf. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Fertilizers	Li. W/C	HMW/C	Radionuclides	Drugs	Cyanide	PHENOLS	TOC	TSS	VSS	DOC	POC	Oil and Grease	Lands	Part. Size Dist.	Sediment Core Date	Remarks
																							H2O

Received By (Signature) **Jim Owens** Date **12/12/80**  
 Received By (Signature) **FED EX** Date **12/12/80**  
 Location: **From Airport (signature)**  
 Location: **From Airport (signature)**  
 Date: **12/12/80**  
 Date: **12/12/80**



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### SAMPLE SHIPPING RECORD

09.20F2

Shipment No

D-351-8

DOVER 9

#### CONSIGNEE

Name

LAUCKS TESTING LAB

No. Street

City, State, Zip

#### SAMPLE ANALYSIS

ATTN: JIM OWENS

Sample No	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanide	PH	TOC	TSS	VSS	DOC	POC	Oil and Grease	Leads	Part. Susp. Sol.	Sediment Core Date	Remarks
85-5203	12/13	1:00	1	QA-15																								H2O
85-5204			1	QA-16																								"
85-5205			42	SD-1																								SEDIMENT
85-5206			42	SD-2																								"
85-5207			42	QA-17																								"

Total No Containers

8

#### SHIPPING CHAIN OF CUSTODY

SA (by) Issued  
Michael B. Bredel  
Shipped By Issued  
AR Bull # 024372/21

Received By (sign)  
Date  
Time

Received By (sign)  
Date  
Time

Received By (sign)  
Date  
Time

Received By (sign)  
Date  
Time

Where SAI

County Lab Representative

Point of Contact Lab

Contracted Lab Reference to SAI



BB

10F3

# SAMPLE SHIPPING RECORD

SCIENCE APPLICATIONS, INC.

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476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791



Shipment No

D-351-8

(D-351-8)

## CONSIGNEE

Name LAUCKS TESTING LAB

No. Street

City, State, Zip

## SAMPLE ANALYSIS

ATTN: JIM OWEN'S

Sample No	Sample Date	Packed Time	No. Containers	Sample Description	Env. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanide	pH	TQC	TSS	VSS	DOC	POC	Oil and Grease	Lipids	Part. Size Dis.	Sediment Core Date	Remarks
85-5089	12/11/80	1:30	1	NW0024																								H2O
85-5090			1	NW0025																								
85-5091			1	NW0027																								
85-5092			1	QA-12																								
85-5093			1	QA-13																								
85-5094			1	QA-14																								
85-5107			1	NW0018																								
85-5108			1	NW0019																								
85-5109			1	NW0020																								
85-5110			1	NW0024																								
85-5111			1	NW0025																								
85-5112			1	NW0027																								
85-5113			1	QA-12																								
85-5114			1	QA-13																								
Sub			14																									

## SHIPPING CHAIN OF CUSTODY

By (Signature) Michael Buckel Date 12/17/80

Shipped By (Signature)

ARBUCKLE 024373121

Received By (Signature)

FED EX

Date

Time

Received By Contract Lab (Signature)

FED EX

Date

Time



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## SAMPLE SHIPPING RECORD

Shipment No.

D-351-8

### CONSIGNEE

Name

LAUCKS TESTING LAB

No. Street

City, State, Zip

### SAMPLE ANALYSIS

ATTN: Jim Owens

Sample No.	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanide	PHENOLS	TDC	TSS	VSS	DOC	POC	Oil and Grease	Lipids	Part. Size Dist.	Sediment Core Date	Remarks
85-5115	12/11/80	1:00	1	GA-14																								H2O
85-5122		7	1	MW018																								
85-5123			1	MW019																								
85-5124			1	MW020																								
85-5125			1	MW024																								
85-5126			1	MW025																								
85-5127			1	MW027																								
85-5128			1	MWP001																								
85-5129			1	MWP002																								
85-5130			1	MWP003																								
85-5131			1	QA-12																								
85-5132			1	QA-13																								
85-5133			1	QA-14																								
85-5143			1	MW024																								
85				Total No Containers																								

### SHIPPING CHAIN OF CUSTODY

SAI (by) (sign)

Signature

Date

Time

Shipped By (sign)

Signature

Date

Time

Received By (sign)

Signature

Date

Time

Courier From Airport (sign)

Signature

Date

Time

Received By (sign)

Signature

Date

Time

Received By (sign)

Signature

Date

Time

Received By (sign)

Signature

Date

Time

Received By (sign)

Signature

Date

Time

Date

Time

Date

Time

Date

Time

Date

Time



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476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

# SAMPLE SHIPPING RECORD

3 of 3

Shipment No

D-3578

## CONSIGNEE

Name

LAUCKS TESTING LAB

No. Street

City, State, Zip

## SAMPLE ANALYSIS

ATTN: SIM OWENS

Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanide	Metals	TOC	BOD	TSS	VSS	DOC	FOC	Oil and Grease	Lipids	Part Size Dis	Sediment Core Date
---------------	---------------	---------------------	--------------	------------------	------------	------------	-------	-------	---------------	-------	---------	--------	-----	-----	-----	-----	-----	-----	----------------	--------	---------------	--------------------

Sample Description

No. Containers

Packed Time

Sample Date

Sample No.

Remarks

85-5144	10/11/80	1																					H2O ✓
85-5145	3/3/81	1																					✓
85-5146	3/3/81	1																					✓
85-5147	3/3/81	1																					✓
85-5148	3/3/81	1																					✓

305 Total No. Containers

## SHIPPING CHAIN OF CUSTODY

SA (by) (sign)	Date	Time	Received By (sign)	Date	Time
Michael B. Buel	10/17/80	000			
Shipping Method	Shipped By (sign)	Date	Courier From Airport (sign)	Date	Time
AIR RAIL	024372121				

Received By Courier (sign)	Date	Time
FEB EX	12/17/80	1500
Received By Contract Lab (sign)	Date	Time



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476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

## SAMPLE SHIPPING RECORD

Shipment No

D-351-9

POWER

### CONSIGNEE

Name

LAUCKS TESTING LAB

No. Street

City, State, Zip

ATTN: JIMOWERS

### SAMPLE ANALYSIS

Sample No.	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanide	pH	TOC	TOX	VSS	DOC	POC	Oil and Grease	Lipids	Part. Size Dis.	Sediment Core Date	Remarks
85-5281	12/17/1990	1400	2	SD-003																✓	✓							Sediment
85-5282			2	SD-005 004																✓	✓							
85-5283			2	SD-006 005																✓	✓							
85-5284			2	SD-007 006																✓	✓							
85-5285			1	SD-008 007																✓	✓							
85-5286			2	SD-9 008																✓	✓							
85-5287			2	SD-10 9																✓	✓							
85-5288			2	SD-11 10																✓	✓							
85-5289			1	SD-12 11																✓	✓							
85-5290			2	SD-12																✓	✓							
85-5338			2	SW-011																✓	✓							
85-5339			2	SW-012																✓	✓							
85-5340			2	SW-013																✓	✓							
85-5341			2	SW-014																✓	✓							
Total No. Containers				26																								

### SHIPPING CHAIN OF CUSTODY

Shipped By (sign)	Date	Time	Received By (sign)	Date	Time	Received By Courier (sign)	Date	Time	
Michael Buch	12/17/1990					FED EX	12/17/1990		
Shipping Method	Shipped By (sign)	Date	Time	Courier From Airport (sign)	Date	Time	Received By Contract Lab (sign)	Date	Time
ARRBY	ARRBY	12/17/1990							



SCIENCE APPLICATIONS, INC.

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476 PROSPECT STREET, LA JOLLA, CA 92036 • (619) 456-2791

# SAMPLE SHIPPING RECORD

10F2

Shipment No.  
D-857-10

DOUGER/D

## CONSIGNEE

Name Charles Dosty Lab

No. Street

City State Zip

## SAMPLE ANALYSIS

*at the time of analysis*

Sample No	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Cyanide	pH	TDC	TSS	VSS	DOC	POC	Lipids	Part. Size Dist.	Sediment Core Data	Remarks
85-5342	1/19	1500	1																							Plaster
85-5343			1																							
85-5344			1																							
85-5345			1																							
85-5346			2	2 VIALS PER																						Sediment
85-5347			2																							
85-5348			2																							
85-5349			2																							
85-5350			2																							
85-5351			2																							
85-5352			2																							
85-5353			2																							
85-5354			2																							
85-5355			2																							
SUB			24																							

## SHIPPING CHAIN OF CUSTODY

SAI (by sign)  
Shipped By Michael B. B. B. Date 1/27/80  
Shipped Method FEDEX Date 1/27/80

Received By (sign) FEDEX Date 1/27/80  
Received By Contract Lab (sign) FEDEX Date 1/27/80



SCIENCE APPLICATIONS, INC.

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476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

# SAMPLE SHIPPING RECORD

Shipment No.

D-351-10

DOVER

## CONSIGNEE

Name

*Quaker Dating Lab*

No. Street

City, State, Zip

## attorney Owens SAMPLE ANALYSIS

City, State, Zip					Sample Date		Packed Time		No. Containers		Sample Description		Remarks			
City, State, Zip					Sample No.		Sample Date		Packed Time		No. Containers		Sample Description		Remarks	
Navy					85-5356		11/2/80		2		2 per Sample		Sediment		↓	
Juchka Boating Club					85-5357		-		2						Water	
No. Street					85-5358				2							
					85-5359				1							
					85-5360				1							
					85-5361				1							
					85-5362				1							
					85-5363				1							
					85-5364				1							
					85-5365				1							
					85-5366				1							
					85-5367				1							
					85-5368				1							

## SHIPPING CHAIN OF CUSTODY

SA (sign)	Date	Time	Received By (sign)	Date	Time	Received By (sign)	Date	Time
<i>Michael R. Smith</i>	12/17/80		<i>Bob Cox</i>	12/17/80		<i>Bob Cox</i>	12/17/80	
Shipping Method	AIR 801106243721		Courier From Airport (sign)	Date	Time	Received By Contract Lab (sign)	Date	Time





SCIENCE APPLICATIONS, INC.

DIVISION OF ENVIRONMENTAL CHEMISTRY & GEOCHEMISTRY  
476 PROSPECT STREET, LA JOLLA, CA 92038 • (714) 454-5811

## SAMPLE SHIPPING RECORD

Shipment No.

D-351-13

### CONSIGNEE

Name *Charles Taylor Lab*

No. Street

City, State, Zip

*with Jim Owens*

### SAMPLE ANALYSIS

Sample No	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Vol. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Radionuclides	Drugs	Cyanide	TOC	DOC	VSS	TSS	Sediment Core Date	Remarks
85-5687	1/16/85	1400	1																				
5688	1/16/85	1400	1																				
Total No. Containers				2																			

### SHIPPING CHAIN OF CUSTODY

SAI (by) (sign)

*Michael K. Bunker*

Date

Received By (sign)

Courier From Airport (sign)

Received By Contract Lab (sign)

Received By Courier (sign)

Date

Time

Shipping Method

*372460*

Date

Received By (sign)

Courier From Airport (sign)

Received By Contract Lab (sign)

Received By Courier (sign)

Date

Time

White - SAI

Canary - Lab Representative

Plat - Contract Lab

Goldenrod - Lab Returns to SAI



Page 2052  
 Shipment No  
 D-351-11

# SAMPLE SHIPPING RECORD

**SCIENCE APPLICATIONS, INC.**  
 DIVISION OF ENVIRONMENTAL CHEMISTRY AND GEOCHEMISTRY  
 476 PROSPECT STREET, LA JOLLA, CA 92038 • (619) 456-2791

## CONSIGNEE

Name Laurel Testing Lab  
 No. Street  
 City, State, Zip

## SAMPLE ANALYSIS

Sample No	Sample Date	Packed Time	No. Containers	Sample Description	Ext. Organics	Surv. Ext. Organics	Surv. Vol. Organics	Trace Metals	Other Inorganics	Pesticides	Herbicides	LMWHC	HMWHC	Re. includes	Cyanide	pH	TOC	BOD	TSS	VSS	DOC	POC	Oil and Grease	Lipids	Part. Size Dist.	Sediment Core Date	Remarks
85-5386	11/14	1300	1	SD-19																							Sediment
85-5391	11/13	1300	1	SL-13																							
85-5392			1	SL-14																							
85-5393			1	SL-15																							
85-5394			1	SL-16																							
85-5395			1	QA-20																							
85-5396			1	SD-020																							
85-5397			1	SD-021																							
85-5398			1	SD-022																							
85-5399			1	SD-023																							
85-5400			1	SD-024																							
85-5401			1	SD-025																							
85-5402			1	SD-026																							
85-5403			1	SD-027																							
Initial No. Containers				14																							

Per Charles Munguia  
 11/23/85, env + phenol  
 to be analyzed for  
 on these 9 samples  
 if called + removed  
 samples at hand  
 on 11/23/85 as this  
 change

## SHIPPING CHAIN OF CUSTODY

SAI (by) <u>Michael Buchel</u>	Date <u>11/20</u>	Time <u>3:30</u>	Received By (sign) <u>Michael Buchel</u>	Date <u>12/20/1330</u>	Time
Shipping Method <u>air Bill</u>	Shipped By (sign) <u>Michael Buchel</u>	Date	Received By Contract Lab (sign)	Date	Time

APPENDIX H: Analytical Results

## QUALITY CONTROL SUMMARY

Submitted To: Edward Tokarski

Project Number: 2-895-06-182-56 Dover Air Force Base

Date Samples Received: December 4, 1984 through January 16, 1985

Date Samples Extracted: Oil and Grease samples in water were extracted within 24 hours of sample receipt.  
Samples for EP Toxicity and Oil and Grease, both in soils extracted within 2 weeks of sample receipt.

Date Samples Analyzed: December 5, 1984 through February 14, 1985

Methodologies Employed: Purgable Halocarbons - Water: EPA Method 601; Soil: EPA Method SW 846  
Purgable Aromatics - Water: EPA Method 602; Soil: EPA Method 846  
Oil and Grease - EPA Method 413.2 - Water  
Extracted by SW 846 analyzed by 413.2 in soil  
Polychlorinated Biphenols - Water: EPA Method 608; Soil: EPA Method SW 846  
Phenols - EPA Method 420.1  
Cyanide - EPA Method 412  
Total Organic Carbon - EPA Method 415.1  
Total Organic Halogen - EPA Method SW 846-9020  
EP Toxicity - 40 CFR 261.24  
Ignitability - 40 CFR 261.21  
Metals - 8 As - EPA Method 206.2  
Cd - EPA Method 213.1/213.2  
Cr - EPA Method 218.1/218.2  
Cu - EPA Method 220.1/220.2  
Fe - EPA Method 236.1/236.2  
Pb - EPA Method 239.1/239.2  
Hg - EPA Method 245.1/245.5  
Ni - EPA Method 249.1/249.2  
Ag - EPA Method 272.1/272.2  
Zn - EPA Method 289.1/289.2

Sample Quality Control: See attached table and narrative

**SAIC**

## APPENDIX H

The Sample Quality Control Report Table shows the values obtained from quality control procedures which are described as follows:

### For PCBs

Because variability is high between spike recoveries for PCB samples, one sample is not considered representative of the set. Therefore, for all PCB samples (media and QA samples), independent QC was performed with the PCB recoveries shown in Attachment A to the table.

### For Metals

Random samples were selected from which three replicates, or aliquots, of each sample were analyzed. Analytical results of the aliquots, shown under the heading "Replicates" in the table, demonstrate generally low variance between aliquot concentrations which are reported in ug/l. Since the analyses for metals are nondestructive, the "Spike Value" used was the average of the three replicate concentrations. To the spike value samples, high and low spike concentrations of each metal were added. Percent recoveries were very good, indicating good quality control. The high and low spike levels used allowed for bracketing of the detection limits, or demonstration of a good operating range for the instrument.

### For TOC, TOX, Cyanide, and Phenol

The same methodology described for metals above was applied. However, only two replicates or aliquots were analyzed, and because some of these tests are destructive, the "Spike Value" used to determine recoveries was from another randomly selected sample. The spike levels added to the samples again were selected to demonstrate good operation of equipment at or above detection limits. All values are expressed in mg/l. The percent recoveries are very good for all analytes except TOX, indicating good quality control. The low spike recoveries for TOX are not uncommon in laboratory analyses.

### For Oil and Grease

No methodology for spike recovery quality control is considered accurate for this parameter. Instead standard (linear regression) curves were developed, as shown in Attachment B to the table, to which sample analyses could be compared. The standard curves for the IR spectra are plotted with absorbance on the y-axis and concentrations in ppm on the x-axis, and the correlation coefficients demonstrate the validity of the curves. Also shown in Attachment B are the infrared spectrophotometry results for concentrations in 100 and 10 mm cells.

# QUALITY CONTROL REPORT 1

DOVER AFB

Parameter	Replicate	Blank	Spike Value	Spike Level	Recovery %
PCBs	21/26-Percent Recoveries	0	see attachment A		
					20-79%-Water 32-73%-Soil
Ag	<0.050/<0.050/<0.050	0			
As	<2.50/<2.50/<2.50	0	<2.50	7.44 low 27.9 high	149-low 112-high
Cd	<0.050/<0.050/<0.050	0	<0.050	5.12 low 25.0 high	102-low 100-high
Cr	<0.020/<0.020/<0.020	0	<0.020	25.1 high	115 low 101 high
Cu	1.69/1.61/1.91	0	1.74	5.71 low 26.6 high	114 low 106 high
Fe	27.4/36.5	0	32.0	33.8 high	135 high
Hg	9.75/2.88/9.50	0	7.38	17.02 low 25.41 high	113 low 102 high
Ni	<2.00/<2.00/<2.00	0	<2.00	4.49 low 26.1 high	90 low 104 high
Pb	7.09/5.12/7.39	0	6.53	4.60 low 27.9 high	92 low 112 high
Zn	1.50/1.66/2.30	0	1.82	3.84 low 24.1 high	77 low 97 high
VOCs		0	see attached		91-140
Oil & Grease	insufficient sample to conduct replicates	0	linear regression see attachment B		

## QUALITY CONTROL REPORT 2

## DOVER AFB

Parameter	Replicate	Percent Difference	Method Spike Value	Spike Level	Recovery %
CN	0.006/0.009	40	0.056	0.050	112
	0.053/0.055	4	0.053	0.050	106
	0.056/0.060	7	0.053	0.050	106
	<0.005/<0.005	0	0.056	0.050	112
	<0.005/<0.005	0			
	<0.005/<0.005	0			
Phenol	0.050/0.049	2	0.050	0.050	100
	0.052/0.053	2	0.052	0.050	104
	0.053/0.066	22	0.066	0.050	100
	0.050/0.050	0	0.050	0.050	100
	0.049/0.048	2	0.049	0.050	98
	9.4/9.3	1	9.4	6.2	100
TOC	24/23	4	26	10	100
	20/20	0	23	10	110
	6.2/6.8	9	15	10	103
	3.0/2.9	3			
	29/31	7			
	1.3/1.4	4			
	0.4/0.4	0			
	0.3/0.3	0			
	0.3/0.4	3			
	1.3/1.6	21			
	4.4/4.7	7			
	1.6/1.5	6			
TOX	0.025/0.025	0	0.048	0.050	44
	0.075/0.073	3			
	0.33/0.37	11			

ATTACHMENT A

PCB Recoveries

MW 024	41%
MW 025	43%
MW 027	21%
MW 027 Rep.	26%
QA 12	79%
QA 13	81%
QA 14	20%
Method Blank	79%

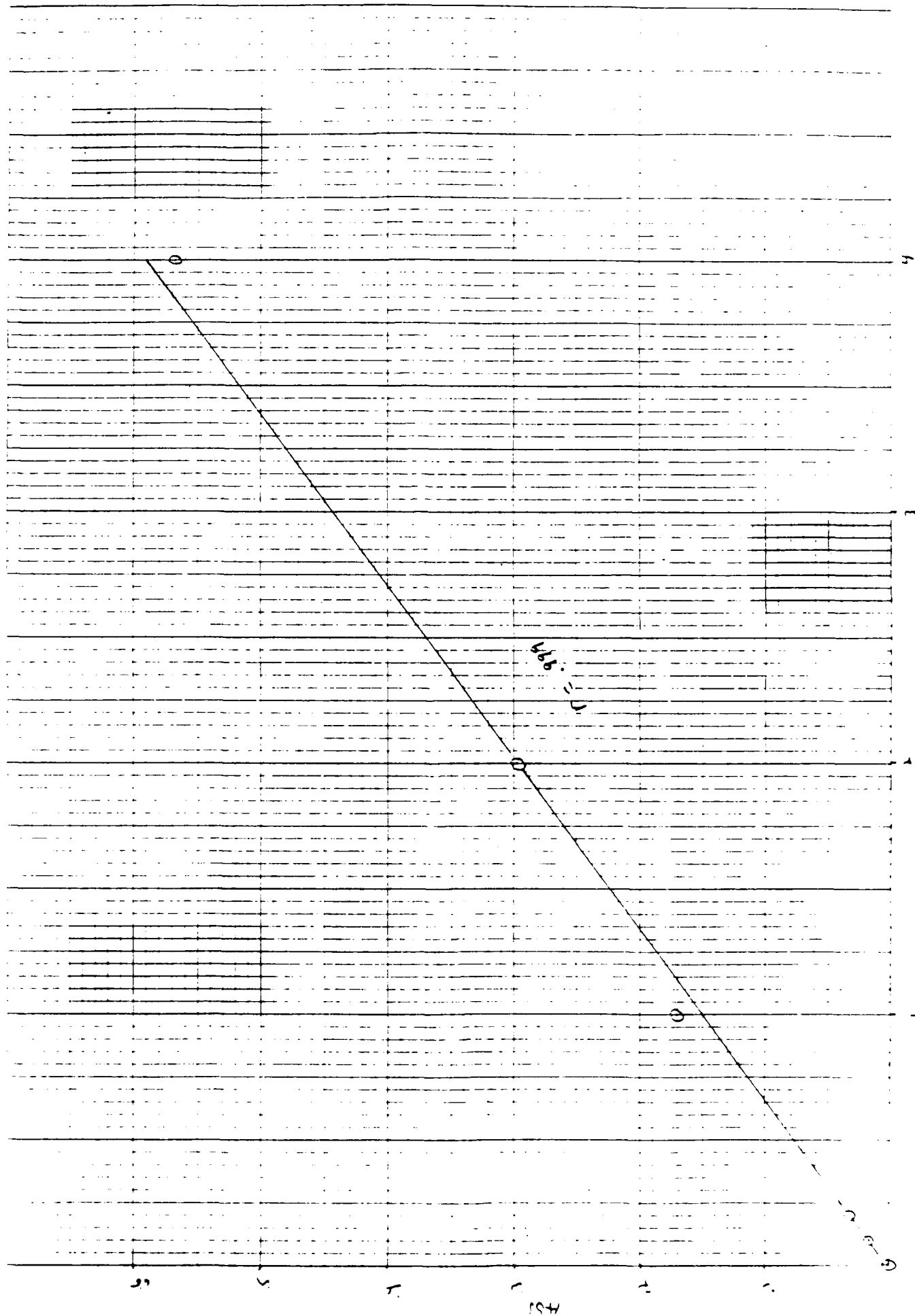
SL 13	73%
SL 14	34%
SL 14-Rep.	37%
SL 15	32%
SL 16	65%

# ATTACHMENT B

THE IZLEN CORPORATION  
MADE IN U.S.A.

FOR THE IZLEN CORP. 100 nm  
100 nm cell standard curve

100 nm cell standard curve



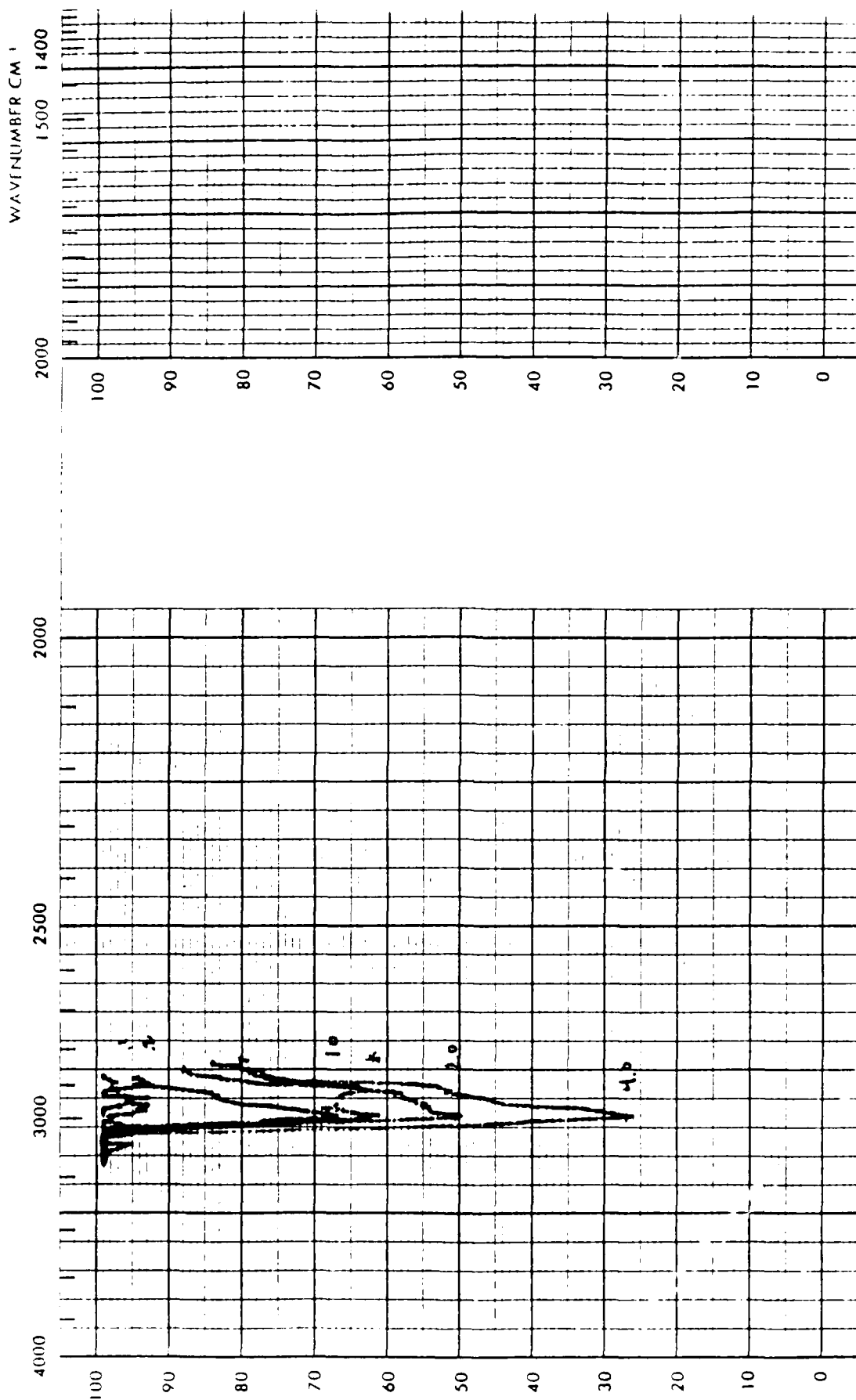


# ATTACHMENT B (continued)

100 nm cell standards

PRINTED IN U.S.A.

WHEN REORDERING SPECIFY CHART NUMBER 26411



25 3 4 5 6 7

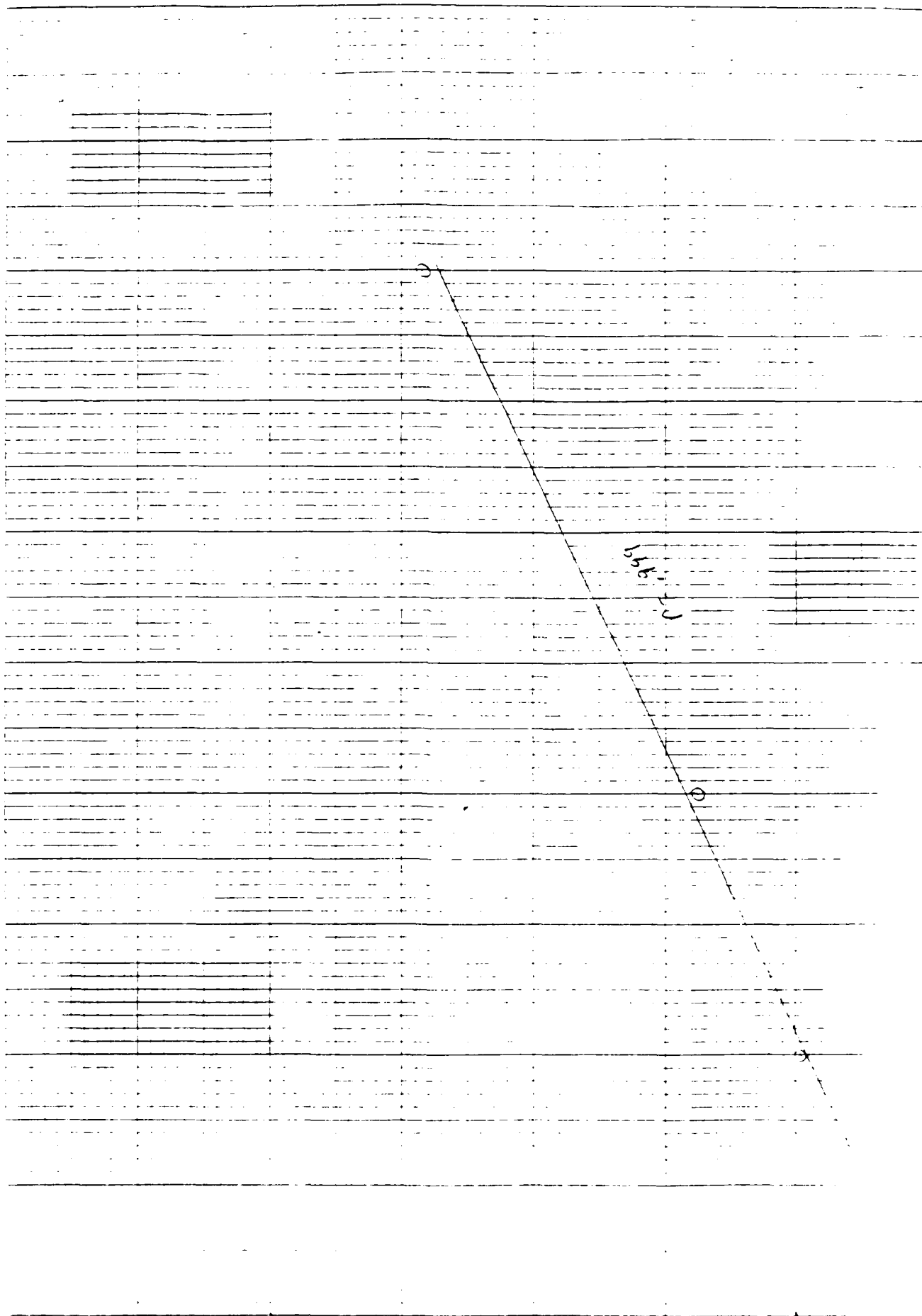
WAVELENGTH IN  $\mu$

ATTACHMENT (continued)

DIETZGEN CORPORATION  
MADE IN U.S.A.

100 PER CENT DIETZGEN GRAPH PAPER  
11 1/2 X 17 PER INCH

10 mm cell shaded curve

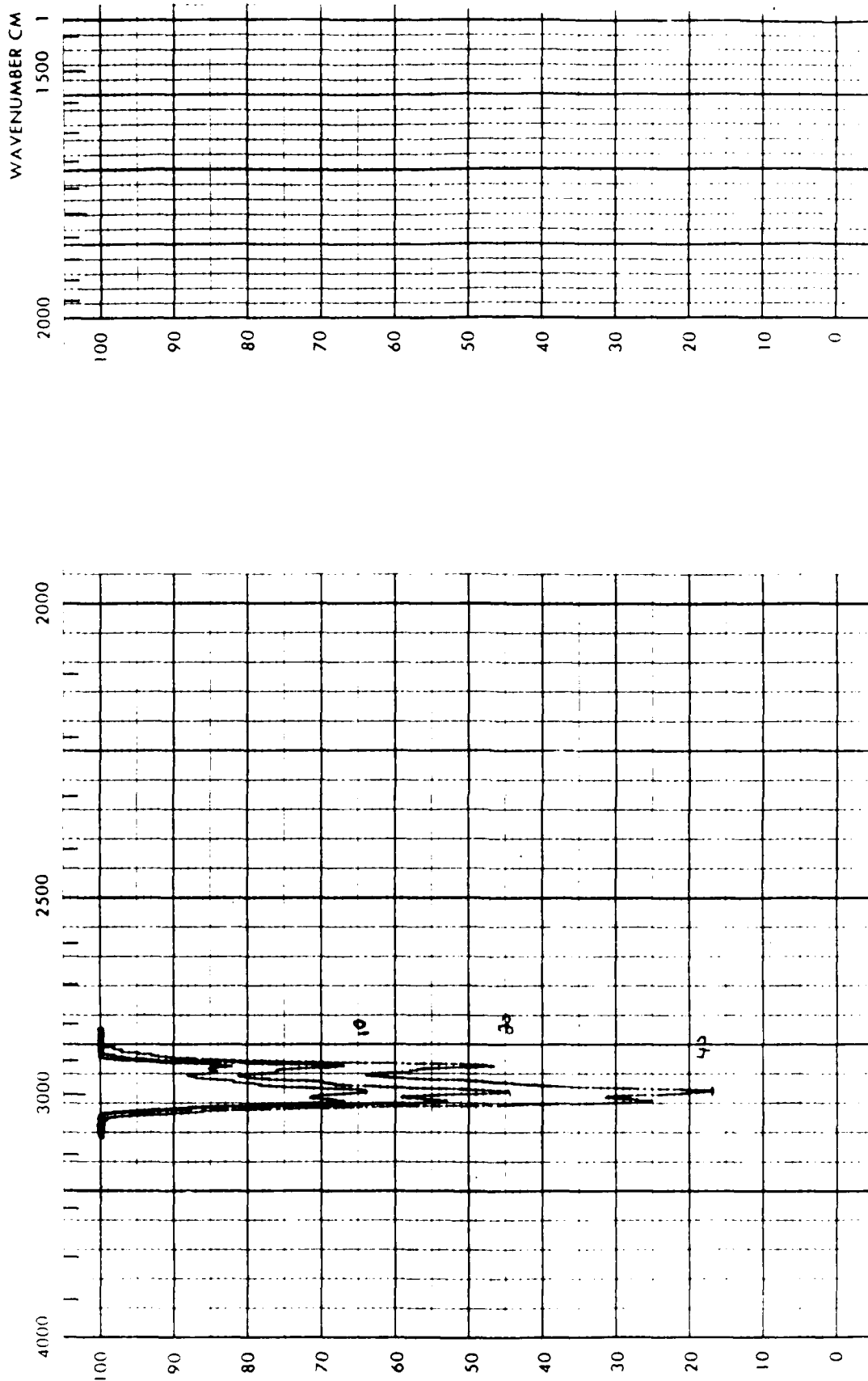


# ATTACHMENT B (continued)

10 mm cell standards

PRINTED IN U.S.A.

WHEN RECORDING, SET CHART NUMBER 76411



2.5 3 4 5 6 7 WAVELENGTH

# ENVIRONMENTAL RESEARCH GROUP, INC.



117 N. First Ann Arbor, Michigan 48104 (313) 662-3104

CLIENT: JRB Associates  
PROJECT NO: A2776  
SAMPLE ID: 125539

Page 1 of 1

## QUALITY CONTROL REPORT DUPLICATE ANALYSIS

SAMPLE IDENTIFICATION	Aliquot 1	Aliquot 2	Relative Percentage Difference
Benzene	12.0	11.0	8.7%
Vinyl chloride	9.0	7.0	25.0%
1,2-Dichloroethane	62.0	68.0	9.2%
trans-1,2-Dichloroethene	220.0	220.0	0.0%
Tetrachloroethene	6.3	6.3	0.0%
Toluene	3.1	3.3	6.3%
Trichloroethene	18.0	18.0	0.0%

All other compounds reported as ND in the initial analysis were also ND in the duplicate analysis.

This QC Report also covers the following sample numbers: 125537-125546  
125599

CLIENT: JRB Associates  
PROJECT NO: A2776  
SAMPLE ID: 125608

Page 1 of 1

QUALITY CONTROL REPORT  
DUPLICATE ANALYSIS

SAMPLE IDENTIFICATION	Aliquot 1	Aliquot 2	Relative Percentage Difference
Chloroform	20.0	20.0	0.0%
1,2-Dichloroethane	25.0	25.0	0.0%
Tetrachloroethene	0.2	0.2	0.0%
Toluene	0.76	1.6	71.2%

All other compounds reported as ND in the initial analysis were also ND in the duplicate analysis.

This QC Report also covers the following sample numbers: 125600-125610

CLIENT: JRB Associates  
PROJECT NO: A2776  
SAMPLE NO: 125599

Page 1 of 1

QUALITY CONTROL REPORT  
MATRIX SPIKE ANALYSIS

Compound Name	SAMPLE RESULT	SPIKED SAMPLE RESULT	SPIKE ADDED	PERCENTAGE RECOVERY
trans-1,2-Dichloroethene	20.0	54.2	28.0	122%
1,2-Dichloroethane	0.58	29.2	22.0	130%
1,1,1-Trichloroethane	0.0	20.2	20.0	101%
1,1-Dichloroethene	45.0	69.4	20.0	122%
Trichloroethene	170.0	200.2	21.6	140%
Benzene	0.0	20.1	20.8	97%
Toluene	0.0	19.6	21.0	93%
Ethylbenzene	0.0	21.2	22.2	95%

This QC report also covers the following sample numbers: 125537-125449 &  
125599

Units of Concentration = ug/l

CLIENT: JRB Associates  
PROJECT NO: A2776  
SAMPLE NO: 125608

Page 1 of 1

QUALITY CONTROL REPORT  
MATRIX SPIKE ANALYSIS

Compound Name	SAMPLE RESULT	SPIKED SAMPLE RESULT	SPIKE ADDED	PERCENTAGE RECOVERY
trans-1,2-Dichloroethene	0.0	32.5	28.0	116%
1,2-Dichloroethane	0.0	24.0	22.0	109%
1,1,1-Trichloroethane	0.0	20.2	20.0	101%
1,1-Dichloroethene	0.0	21.3	20.0	107%
Trichloroethene	0.0	23.3	21.6	108%
Benzene	0.0	19.0	20.8	91%
Toluene	0.76	21.4	21.0	98%
Ethylbenzene	0.0	22.0	22.2	99%

This QC report also covers the following sample numbers: 125600-125610

Units of Concentration = ug/l

SAMPLE LOCATION	OIL & GREASE mg/l	CYANIDE mg/l	PHENOLS mg/l	TOX mg/l	TOC mg/l	PCB ug/l	POC mg/l
MW 010	0.44	<0.005	<0.005	0.045	8.9		3.9
MW 011	0.45	0.007		0.08	4.5		1.3
MW 012	<0.10	<0.005	<0.005	0.016	2.3		0.9
MW 013	1.30	0.008	0.011	0.093	24.0		10.
MW 021	<0.10	0.009	<0.005	0.065	2.8		1.7
MW 022	0.15	0.006	<0.005	0.10	2.4		1.0
MW 023	0.12	<0.005	<0.005	<0.010	5.4		1.7
QA1	0.11	<0.005	<0.005	75.	2.5		1.5
QA2	0.19	<0.005	<0.005	0.068	20.0		1.5
QA3	<0.10	0.007	<0.005	<0.010	2.9		1.3
QA4	0.28	<0.005	<0.005	0.064	4.7		1.4
QA5	<0.10	<0.005	<0.005	0.035	6.8		1.4
MW 005	<0.10	0.009	<0.005	0.12	23.0		0.7
MW 006	<0.10	<0.005	<0.005	0.075	2.8		0.6
MW 007	<0.10	<0.005	<0.005	0.073	6.6		0.6
MW 008	0.26	<0.005	<0.005	0.095	5.3		1.1
MW 009	<0.10	<0.005	<0.005	0.065	2.7		0.4
MW 014	<0.10			0.045	16.0		<0.1
MW 015	<0.10			0.073	3.4		0.5
MW 016	<0.10			0.045	1.6		0.3
MW 017	<0.10			0.073	2.6		0.5
QA6	<0.10	<0.005	<0.005	0.068	1.8		0.4
QA7	<0.10	<0.005	<0.005	0.075	5.5		0.5
MW P005	<0.10				5.0		1.0
MW P006	<0.10				3.3		1.5
MW P007	2.02				20.		14.
MW P008	1.42				11.		7.2



SAMPLE LOCATION	OIL & GREASE mg/l	CYANIDE mg/l	PHENOLS mg/l	TOX mg/l	TOC mg/l	PCB ug/l	POC mg/l
MW 001	<0.10	<0.005	<0.005	0.33	3.0		1.4
MW 002	<0.10	<0.005	<0.005	0.26	3.7		0.6
MW 004	<0.10	<0.005	<0.005	0.26	2.5		0.3
MW 101	<0.10	<0.005	<0.005	0.32	3.4		0.2
MW 102	<0.10	<0.005	0.016	0.46	11.		1.6
MW 103	0.82	<0.005	6.3	7.5	74.		32.
QA8	<0.10	<0.005	<0.005	0.33	2.4		0.4
QA9	<0.10	<0.005	<0.005	0.23	1.2		<0.1
QA10	<0.10	<0.005	<0.005	0.23	1.8		0.1
MW 018	0.14			0.12	1.6		0.2
MW 019	0.11			0.13	1.3		0.6
MW 020	<0.10			0.12	8.9		1.8
MW 024	0.11	0.006	<0.005	0.10	3.0	ND	1.0
MW 025	<0.10	<0.005	<0.005	1.0	1.9	ND	1.1
MW 027	<0.10	0.006	<0.005	1.4	3.8	ND	2.3
MW P001	0.12				2.1		0.7
MW P002	0.43*				4.9		2.1
MW P003	0.24				32.		1.6
QA12	<0.10	0.006	<0.005	0.10	0.4	ND	0.1
QA13	<0.10	0.010	0.006	0.10	0.7	ND	<0.1
QA14	0.49	0.006	<0.005	8.2	4.7	ND	2.2

\*approximately 10% of sample lost in analysis.

SAMPLE LOCATION	OIL & GREASE mg/l	CYANIDE mg/l	PHENOLS mg/l	TOX mg/l	TOC mg/l	PCB ug/l	POC mg/l
SW001	92.9	0.010	34.	1.2	300.		58.
SW002	26.1	0.013	0.026	1.2	110.		16.
SW003	0.25	<0.005	<0.005	2.6	16.		11.
SW004	0.18	<0.005	<0.005	0.11	11.		0.9
SW005	0.25	<0.005	<0.005	0.06	8.9		0.5
SW006	<0.10	<0.005	<0.005	0.09	7.7		0.2
SW007	<0.10	<0.005	<0.005	0.06	5.8		0.3
SW008	0.16	<0.005	<0.005	0.09	4.5		0.2
QA11	<0.1	<0.005	<0.005	0.08	0.6		<0.1
SW009	<0.10			0.094	3.0		0.2
SW010	<0.10			0.066	2.5		0.2
SW011	<0.10				4.4		0.8
SW012	0.21				4.9		0.2
SW013	<0.10				4.1		<0.1
SW014	<0.10				5.3		<0.1
SW001B	1.25	0.013	44.				
SW002B	2.69	0.010	3.1				
SW011B	0.34						
SW012B	<0.10						
SW013B	0.21						
SW014B	<0.10						
SW016	<0.10				29.		0.2
QA18	<0.10			0.066	12.		<0.1
QA19	<0.10			0.094	18.		0.2
QA15	2.30	<0.005	<0.005	1.0	3.2		0.7
QA16	17.0	0.013	0.056	1.5	120.		11.
0052-ND-016	<0.10				13.0		0.1

SAMPLE LOCATION	OIL & GREASE mg/kg	CYANIDE mg/kg	PHENOLS mg/kg	TOX mg/kg	TOC (%)	PCB ug/kg
SD009	119			2.1	0.3%	
SD0010	114			3.1	1.8%	
SD0011	232			0.89	2.3%	
SD0012	<3.0			0.59	1.3%	
SD003	75.7	0.2	0.3	0.15	0.3%	
SD004	390	0.7	<0.1	<0.1	0.9%	
SD005	328	0.2	<0.1	0.31	0.1%	
SD006	2,770	0.8	0.1	0.20	2.2%	
SD-1	7,040	0.2	3.2	16.	3.2%	
SD-2	1,070	0.2	0.1	0.12	1.2%	
QA17	1,240	0.2	<0.1	0.18	<0.01%	
SD007	136	0.1	<0.1	0.27	<0.1%	
SD008	1,430	1.1	0.5	1.8	4.4%	
SD17	3.53				0.2%	
SD019	65.1				0.9%	
SL13	71.3	0.3	<0.1	2.9	0.3%	240-1260
SL14	629	0.4	<0.1	1.8	1.1%	ND
SL15	291	0.4	0.9	1.1	1.4%	ND
SL16	23.7	0.1	0.8	0.26	0.3%	ND
QA20	63.9			0.96	4.1%	
SD020	78.0			1.1	2.3%	
SD021	46.4			0.98	4.8%	
SD022	71.4			0.97	2.4%	
SD023	65.4			0.63	4.2%	
SD024	53.4			0.89	3.4%	
SD025	7.56			0.65	4.6%	
SD026	17.3			0.53	1.3%	
SD027	12.4			0.24	1.5%	

DR-1 EP Toxicity - samples passed

Ignitability - not flammable

Note: All soil samples reported on dry basis

SAMPLE LOCATION	Ag (ug/l)	As (ug/l)	Cd (ug/l)	Cr (ug/l)	Cu (ug/l)	Fe (ug/l)	Hg (ng/l)	Ni (ug/l)	Pb (ug/l)	Zn (ug/l)
QA-8	<0.050	<25.0	0.084	<0.200	1.88	<1.00	334.	<2.00	7.1	1.51
QA-9	<0.050	<25.0	<0.050	<0.200	2.43	<1.00	28.6	<2.00	12.4	15.4
QA-10	<0.050	<25.0	0.186	9.81	4.99	7.32	23.9	9.01	6.72	1.12
6P-34 1483	0.089	<25.0	0.536	89.4	42.1	72.7	109.	43.4	59.9	8.12
SW003	<0.050	<25.0	0.685	0.415	1.33	3.74	18.1	6.18	6.34	19.6
SW005	0.051	<25.0	2.47	1.92	15.2	5.06	23.6	31.6	11.3	24.5
SW006	<0.050	<25.0	1.18	0.809	5.10	1.70	26.5	11.7	5.11	14.3
SW007	<0.050	<25.0	1.24	0.940	4.55	1.43	8.00	4.19	6.87	13.1
SW008	0.090	<25.0	2.35	2.45	5.45	1.69	74.9	4.16	11.8	148.6
QA-11	<0.050	<25.0	0.205	0.323	1.39	<1.00	<6.25	<2.00	4.55	1.22
MW-018	<0.050	<25.0	0.578	27.2	14.4	10.8	9.75	54.8	17.4	45.2
MW-019	<0.050	<25.0	0.783	1.40	12.6	3.37	9.50	<2.00	1.98	32.3
MW-020	<0.050	<25.0	2.83	3.77	9.68	24.5	<6.25	14.0	10.9	47.1
MW-024	0.051	<25.0	1.24	89.1	55.5	28.8	98.4	43.1	12.1	17.7
MW-025	0.085	<25.0	1.31	234.	90.7	41.4	195.	49.5	108.	136.
MW-027	0.120	<25.0	0.510	56.3	28.1	15.2	141.	32.7	14.6	45.
QA-12	<0.050	<25.0	0.207	<0.200	1.28	<1.00	<6.25	<2.00	1.15	1.00
QA-13	0.30	<25.0	<0.050	<0.200	1.22	<1.00	10.8	<2.00	12.5	14.6
QA-14	0.141	<25.0	0.631	53.3	31.1	17.5	100.	28.4	67.3	104.
SW-001	1.18	<25.0	139.	2495.	99.9	2.51	26.8	55.1	124.	50.7
SW-002	0.799	<25.0	121.	783.	44.9	1.84	<6.25	15.7	51.2	271.
QA-15	<0.050	<25.0	<0.050	0.493	1.31	<1.00	<6.25	6.50	1.98	5.44
QA-16	0.931	<25.0	129.	775.	46.7	1.90	46.4	15.6	52.7	279.
SW-011	<0.050	<25.0	0.540	2.11	1.48	3.55	9.13	<2.00	4.29	25.6
SW-012	<0.050	<25.0	0.920	1.56	3.12	3.75	<6.25	<2.00	8.68	34.8
SW-013	<0.050	<25.0	1.63	2.75	4.13	7.46	64.8	<2.00	17.7	46.9
SW-014	<0.050	<25.0	0.434	5.73	2.32	5.28	<6.25	<2.00	7.09	27.9
QA-18	<0.050	<25.0	0.555	0.476	1.14	<1.00	<6.25	<2.00	0.970	3.77
QA-19	0.056	<25.0	0.388	0.717	1.47	0.234	<6.25	<2.00	1.85	41.4
SW-9	0.393	<25.0	0.310	1.87	2.35	0.279	<6.25	<2.00	11.6	19.9
MW-010	0.050	<25.0	0.229	40.6	15.3	12.8	105.	12.0	13.3	43.5
MW-011	0.050	<25.0	0.340	17.0	12.1	4.58	10.	6.41	5.45	1.8
MW-012	0.050	<25.0	0.081	17.5	8.26	9.33	16.3	11.7	7.29	11.2
MW-013	<0.050	<25.0	0.210	27.5	24.3	28.4	171.	10.2	14.2	35.4
MW-021	<0.050	<25.0	0.458	26.9	8.39	5.95	11.6	21.1	15.1	54.2
MW-022	<0.050	<25.0	0.166	11.4	7.01	5.16	7.38	5.78	3.82	27.3
MW-023	0.149	<25.0	0.364	64.1	25.0	40.9	78.5	19.6	24.9	64.1
QA-1	<0.050	<25.0	<0.050	0.904	2.73	<1.00	28.1	3.41	0.533	1.75
QA-2	<0.050	<25.0	0.119	17.3	7.54	6.52	32.9	10.2	12.2	27.1
QA-3	<0.050	<25.0	<0.050	0.020	1.74	32.0	<6.25	<2.00	6.53	1.42
QA-4	<0.050	<25.0	0.066	0.720	3.58	0.022	11.4	<2.00	0.500	4.72
QA-5	<0.050	<25.0	0.119	0.570	3.06	0.017	<6.25	6.60	0.562	11.6
MW-005	0.063	<25.0	0.402	7.00	6.70	5.23	42.4	13.6	5.33	22.4
MW-006	<0.050	<25.0	0.228	31.9	13.4	8.14	212.	17.4	15.3	37.4
MW-007	<0.050	<25.0	0.365	5.34	5.14	11.0	7.00	1.4	14.4	23.7
MW-008	<0.050	<25.0	0.097	1.92	1.73	1.75	30.8	9.11	1.22	7.56
MW-009	0.093	<25.0	0.502	84.2	53.1	90.7	394.	52.6	62.7	122.
MW-014	<0.050	<25.0	0.411	12.7	4.50	4.09	28.6	16.4	7.68	23.1
MW-015	<0.050	<25.0	0.269	3.68	3.43	1.72	40.4	7.44	3.44	10.3
MW-016	<0.050	<25.0	0.113	2.71	2.47	1.89	39.5	6.66	2.65	12.7
MW-017	<0.050	<25.0	0.129	3.33	2.81	1.39	37.1	12.0	2.62	14.9
QA-6	<0.050	<25.0	0.063	0.620	1.28	<1.00	22.4	7.44	1.69	1.36
QA-7	<0.050	<25.0	0.190	0.586	1.59	1.30	44.9	6.66	2.09	12.6
MW-001	<0.050	<25.0	0.113	13.4	5.78	4.62	330.7	7.41	6.34	17.5
MW-002	0.066	<25.0	0.616	119.	55.5	141.	345.7	133.	55.4	173.
MW-004	<0.050	<25.0	0.452	14.3	9.30	11.8	58.9	12.8	0.45	12.1
MW-001	0.064	<25.0	0.386	63.4	39.0	52.4	383.	44.7	26.1	47.6
MW-002	0.128	<25.0	0.530	71.2	44.1	69.0	474.	75.0	54.1	75.5
MW-003	0.334	<25.0	0.861	455.	185.	170.	380.	275.	237.	470.
SW-10	<0.050	<25.0	0.368	0.660	1.36	0.216	<6.25	<2.00	1.46	42.7

TRACE METALS IN SOILS COLLECTED FROM DOVER AFB (NOV., DEC. '84)  
(Values in ug/g dry weight unless otherwise noted)

SAMPLE LOCATION	Ag	As	Cd	Cr	Cu	Fe (%)	Hg (ng/g)	Ni	Pb	Zn
SD-1	0.246	4.05	15.2	378.	17.2	0.216	55.0	5.08	102.	66.6
SD-2	0.050	37.2	2.71	68.1	6.63	0.460	19.6	5.78	24.0	22.6
QA-17	0.048	42.7	3.11	76.5	7.17	0.474	13.2	4.85	27.0	25.6
SD-009	0.039	11.1	0.667	10.2	6.69	0.524	17.9	5.43	47.3	18.0
SD-010	0.129	22.6	8.98	26.7	19.8	1.03	55.5	12.9	170.	75.5
SD-011	0.063	78.0	1.56	24.3	14.0	1.85	54.1	26.1	29.3	48.1
SD-012	0.058	41.4	0.763	16.3	12.1	1.08	48.9	14.0	56.5	46.6
SD-003	0.020	6.61	0.668	9.05	0.675	0.141	1.28	0.688	5.13	44.3
SD-004	0.686	36.5	2.22	146.	1147.	4.91	71.8	748.	739.	3757.
SD-005	0.446	19.6	2.51	90.5	453.	1.86	30.2	306.	342.	1588.
SD-006	2.42	18.8	16.3	126.	74.2	0.658	143.	30.5	361.	389.
SD-007	0.427	10.3	4.12	17.3	3.03	0.032	17.7	1.45	30.4	57.1
SD-008	2.35	48.5	48.2	281.	77.3	3.02	722.	42.8	532.	888.
SL-013	0.047	32.0	1.11	15.3	9.94	0.826	35.9	13.7	44.5	57.3
SL-14	0.034	25.8	3.90	13.8	12.7	0.719	34.7	9.95	47.2	52.9
SL-15	0.081	34.7	1.71	30.4	268.	0.704	65.1	12.6	183.	221.
SL-16	0.020	45.0	0.222	14.0	10.1	0.560	19.9	9.19	21.9	38.5
QA-20	0.071	26.7	0.225	7.81	5.82	0.378	56.9	6.49	30.6	58.9
SD-020	0.070	27.4	0.163	7.56	5.24	0.400	62.2	7.37	34.2	72.5
SD-021	0.084	29.5	0.246	7.98	6.40	0.269	61.0	4.82	28.5	120.
SD-022	0.089	34.1	0.295	10.9	5.99	0.351	81.3	4.93	39.5	29.1
SD-023	0.050	26.7	0.068	8.65	5.13	0.797	77.7	5.44	28.7	19.2
SD-024	0.050	32.2	0.106	8.50	4.69	0.458	56.0	5.24	31.4	21.0
SD-25	0.040	32.3	0.094	8.62	4.22	0.598	23.2	5.92	176.	23.0
SD-26	0.031	48.5	0.060	12.4	3.89	1.01	23.7	8.60	13.3	23.3
SD-27	0.034	46.4	0.060	11.2	5.04	1.06	30.6	10.0	14.8	26.4

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CLIENT Science Applications International Corporation  
476 Prospect Street  
La Jolla, CA 92038  
ATTN: Dana Errett

LABORATORY NO 87664

DATE Jan. 21, 1985

PO #11-850423-38

REPORT ON WATER

SAMPLE  
IDENTIFICATION

Submitted 12/05/85 and identified as shown:

TESTS PERFORMED  
AND RESULTS

- |     |                     |          |
|-----|---------------------|----------|
| 1)  | 85-4290 5-1         | 11/28/84 |
| 2)  | 85-4291 5-2         | 11/28/84 |
| 3)  | 85-4292 5-2R        | 11/28/84 |
| 4)  | 85-4293 5-3         | 11/28/84 |
| 5)  | 85-4294 5-4         | 11/28/84 |
| 6)  | 85-4295 Field Blank | 11/28/84 |
| 7)  | 85-4296 Boiler Wash | 11/28/84 |
| 8)  | 85-4311 5-1         | 11/28/84 |
| 9)  | 85-4312 5-2         | 11/28/84 |
| 10) | 85-4313 5-2R        | 11/28/84 |
| 11) | 85-4314 5-3         | 11/28/84 |
| 12) | 85-4315 5-4         | 11/28/84 |
| 13) | 85-4316 Field Blank | 11/28/84 |
| 14) | 85-4317 Boiler Wash | 11/28/84 |
| 15) | 85-4325 5-1         | 11/28/84 |
| 16) | 85-4326 5-2         | 11/28/84 |
| 17) | 85-4327 5-2R        | 11/28/84 |
| 18) | 85-4328 5-3         | 11/28/84 |
| 19) | 85-4329 5-4         | 11/28/84 |
| 20) | 85-4330 Field Blank | 11/28/84 |
| 21) | 85-4331 Boiler Wash | 11/28/84 |
| 22) | 85-4376 8-1         | 11/28/84 |
| 23) | 85-4377 8-2         | 11/28/84 |
| 24) | 85-4378 8-3         | 11/28/84 |
| 25) | 85-4379 8-4         | 11/28/84 |
| 26) | 85-4380 Field Blank | 11/28/84 |
| 27) | 85-4381 8-1         | 11/28/84 |
| 28) | 85-4382 8-2         | 11/28/84 |
| 29) | 85-4383 8-3         | 11/28/84 |
| 30) | 85-8384 8-4         | 11/28/84 |
| 31) | 85-4385 Field Blank | 11/28/84 |
| 32) | 85-4396 8-1         | 11/28/84 |
| 33) | 85-4397 8-2         | 11/28/84 |
| 34) | 85-4398 8-3         | 11/28/84 |



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35)	85-4399	8-4	11/28/84
36)	85-4400	Field Blank	11/28/84
37)	85-4478	3-2	11/30/84
38)	85-4479	3-2R	11/30/84
39)	85-4480	3-3	11/30/84
40)	85-4481	3-4	11/30/84
41)	85-4482	3-5	11/30/84
42)	85-4483	3-6	11/30/84
43)	85-4578	3D-1	11/30/84
44)	85-4579	33-1	11/30/84
45)	85-4580	3-2	11/30/84
46)	85-4581	3-2R	11/30/84
47)	85-4582	3-3	11/30/84
48)	85-4583	3-4	11/30/84
49)	85-4584	3-5	11/30/84
50)	85-4585	3-6	11/30/84
51)	85-4484	mw-010	11/29/1300 EFT D4
52)	85-4485	mw-011	11/29/1350 EFT D4
53)	85-4486	mw-012	11/29/1600 EFT D4
54)	85-4487	mw-013	11/30/84 812-56 Dover AFB-site 4 MWB ET
55)	85-4488	mw-021	11/30/84 812-56 Dover AFB-site 5 MW-02 ET
56)	85-4489	mw-022	11/30/84 812-56 Dover AFB-Site 5 1130 MW022 ET
57)	85-4490	mw-023	11/30/84 812-56 Dover AFB-Site 5 1015 MW023 ET
58)	85-4491	QA-1	11/29/1515 EFT D-4
59)	85-4492	QA-2	11/29/ EFT D-4
60)	85-4493	QA-3	11/29/1600 EFT D-4
61)	85-4494	QA-4	Dover AFB 11/30/84 ET 812-56
62)	85-4495	QA-5	Dover AFB 11/30/84 ET 812-56
63)	85-4496	11/30/84	Boiler Wash
64)	85-4497	11/30/84	Field Blank
65)	85-4498	11/30/84	3-1
66)	85-4499	11/30/84	3D-1
67)	85-4500	11/30/84	3-2
68)	85-4501	11/30/84	3-2R
69)	85-4502	11/30/84	3-3
70)	85-4503	11/30/84	3-4
71)	85-4504	11/30/84	3-5
72)	85-4505	11/30/84	3-6
73)	85-4518	11/30/84	Boiler Wash
74)	85-4519	11/30/84	Field Blank



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- 75) 85-4476 11/30/84 3-1
- 76) 85-4477 11/30/84 3D-1
- 77) 85-4506 mw-010 EFT
- 78) 85-4507 mw-011 11/29/1350 EFT
- 79) 85-4508 m2-012 11/29/1600 EFT
- 80) 85-4509 Dover AFB-Site 4 mw-13 ET 11/30/84
- 81) 85-4510 Dover AFB-Site 5 mw-021 ET 812-56 11/30/84
- 82) 85-4511 Dover AFB-Site 5 mw-022 11/30/84
- 83) 85-4526 Dover AFB-Site 5 mw-023 11/30/84 1015 ET 812-56
- 84) 85-4527 QA-1 11/29/1515 EFT
- 85) 85-4528 QA-2 11/29 EFT
- 86) 85-4529 QA-3 11/29/1600 EFT Dover AFB
- 87) 85-4530 Dover AFB QA-4 11/30/84 2050 ET
- 88) 85-4531 Dover AFB QA-5 11/30/84 1300 ET
- 89) 85-4586 mw-010 11/29/1300 EFT
- 90) 85-4587 m2-012 11/29/1600 EFT
- 91) 85-4512 812-56 Dover AFB-Site 5 mw-023 11/30/84 1015
- 92) 85-4513 QA-1 11/29/1515 EFT
- 93) 85-4514 QA-2 11/29/1515 EFT
- 94) 85-4515 QA-3 11/29/1400 EFT D-4
- 95) 85-4516 82-56 Dover AFB QA-4 11/30/84 1050
- 96) 85-4517 812-56 Dover AFB QA-5 11/30/84 1300
- 97) 85-4520 mw-010 11/29/1300 EFT D-4
- 98) 85-4521 mw-011 11/29/1350 EFT D-4
- 99) 85-4522 mw-012 11/29/1600 EFT D-4
- 100) 85-4523 812-56 Dover AFB Site 4 mw-13 11/30/84 0900 ET
- 101) 85-4524 812-56 Dover AFB Site 5 mw-021 11/30/84 1230 ET
- 102) 85-4525 812-56 Dover AFB Site 5 mw-022 11/30/84 1130 ET
- 103) 85-4588 812-56 Dover AFB Site 4 mw-13 11/30/84 0900 ET
- 104) 85-4589 812-56 Dover AFB Site 5 mw-021 11/30/84 1230 ET
- 105) 85-4590 812-56 Dover AFB Site 5 mw-022 11/30/84 1130 ET
- 106) 85-4591 812-56 Dover AFB Site 5 mw-023 11/30/84 1015 ET
- 107) 85-4592 QA-1 11/29/1515 EFT D-4
- 108) 85-4593 QA-2 11/29 EFT D-4
- 109) 85-4594 QA-3 11/29/EFT D-4
- 110) 85-4595 812-56 Dover AFB QA-4 11/30/84 1050 ET
- 111) 85-4596 812-56 Dover AFB QA-5 11/30/84 1300
- 112) 85-4597b 11/30/84 Boiler Wash
- 113) 85-4598 11/30/84 Field Blank
- 114) 812-56 Dover AFB-D-10 mw-005 0800 12/4/84 ET 85-4607



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115) 812-56 Dover AFB-D-10 mw-006 1300 12/4/84 ET 85-4607  
116) 812-56 Dover AFB-D-10 mw-007 1315 12/4/84 ET 85-4607  
117) 812-56 Dover AFB-D-10 mw-008 1900 12/4/84 ET 85-4610  
118) 812-56 Dover AFB-D-10 mw-009 1025 12/4/84 ET 85-4611  
119) 812-56 Dover AFB-D-10 mw-014 0845 12/4/84 ET 85-4612  
120) 812-56 Dover AFB-D-10 mw-015 0930 12/4/84 ET 85-4613  
121) 812-56 Dover AFB-D-10 mw-016 0915 12/4/84 ET 85-4614  
122) 812-56 Dover AFB-D-10 mw-017 12/4/84 ET 85-4615  
123) 812-56 QA-6 1408 12/4/84 ET 85-4616  
124) 812-56 QA-7 1400 12/4/84 ET 85-4617  
125) 812-56 Dover-D-10 mw-005 0800 12/4/84 ET 85-4618  
126) 812-56 Dover-D-10 mw-006 12/4/84 ET 85-4619  
127) 812-56 Dover-D-10 mw-007 1315 12/4/84 ET 85-4620  
128) 812-56 Dover-D-10 mw-008 1400 12/4/84 ET 85-4621  
129) 812-56 Dover-D-10 mw-009 1025 12/4/84 ET 85-4622  
130) 812-56 Dover-D-10 mw-014 0845 12/4/84 ET 85-4623  
131) 812-56 Dover-D-10 mw-015 0930 12/4/84 ET 85-4624  
132) 812-56 Dover-D-10 mw-016 0915 12/4/84 ET 85-4625  
133) 812-56 Dover-D-10 mw-017 12/4/84 ET 85-4626  
134) 812-56 QA-6 1400 12/4/84 ET 85-4627  
135) 812-56 QA-7 1400 12/4/84 ET 85-4628  
136) 812-56 Dover-D-10 mw-005 0800 12/4/84 ET 85-4640  
137) 812-56 Dover-D-10 mw-006 1300 12/4/84 ET 85-4641  
138) 812-56 Dover-D-10 mw-007 1315 12/4/84 ET 85-4642  
139) 812-56 Dover-D-10 mw-008 1400 12/4/84 ET 85-4643  
140) 812-56 Dover-D-10 mw-009 1025 12/4/84 ET 85-4644  
141) 812-56 QA-6 1400 12/4/84 ET 86-4645  
142) 812-56 QA-7 1400 12/4/84 ET 85-4646  
143) 812-56 Dover AFB-D-10 mw-005 0800 12/4/84 ET 85-4647  
144) 812-56 Dover AFB-D-10 mw-006 1300 12/4/84 ET 85-4648  
145) 812-56 Dover-D-10 mw-007 12/4/84 1315 ET 85-4649  
146) 812-56 Dover-D-10 mw-008 12/4/84 1400 ET 85-4650  
147) 812-56 Dover-D-10 mw-009 12/4/84/1025 ET 85-4651  
148) 812-56 QA-6 12/4/84 1400 ET 85-4652  
149) 812-56 QA-7 12/4/84 1400 ET 85-4653



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Sample #	Total Organic Carbon	Purgeable Organic Carbon	Sample #	Total Organic Carbon	Purgeable Organic Carbon
1	84.	5.2	56	2.4	1.0
2	86.	5.4	57	5.4	1.7
3	10.	6.6	58	2.5	1.5
4	92.	8.1	59	20.	1.5
5	88.	4.7	60	2.9	1.3
6	1.1	0.4	61	4.7	1.4
7	1.4	0.6	62	6.8	1.4
22	95.	23.	63	8.3	1.3
23	33.	7.4	64	2.1	1.4
24	120.	26.	75	7.6	1.1
25	130.	24.	76	3.8	1.4
26	1.4	0.8	114	23.	0.7
37	51.	7.4	115	2.8	0.6
38	20.	7.0	116	6.6	0.6
39	80.	12.	117	5.3	1.1
40	8.3	4.4	118	2.7	0.4
41	10.	6.1	119	16.	L/0.1
42	14.	9.9	120	3.4	0.5
51	8.9	3.9	121	1.6	0.3
52	4.5	1.3	122	2.6	0.5
53	2.3	0.9	123	1.8	0.4
54	24.	10.	124	5.3	0.5
55	2.8	1.7			



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<u>Sample #</u>	<u>Cyanide, parts per million (mg/L)</u>
83	L/0.005
84	L/0.005
85	L/0.005
86	0.007
87	L/0.005
88	L/0.005
97	L/0.005
98	0.007
99	L/0.005
100	0.008
101	0.009
102	0.006
143	0.009
144	L/0.005
145	L/0.005
146	L/0.005
147	L/0.005
148	L/0.005
149	L/0.005



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parts per million (mg/L)

<u>Sample #</u>	<u>Phenols</u>
8	L/0.005
9	L/0.005
10	L/0.005
11	L/0.005
12	L/0.005
13	L/0.005
14	L/0.005
32	L/0.005
33	L/0.005
34	L/0.005
35	L/0.005
36	L/0.005
43	L/0.005
44	0.013
45	0.006
46	L/0.005
47	L/0.005
48	0.005
49	L/0.005
50	L/0.005

parts per million (mg/L)

<u>Sample #</u>	<u>Phenols</u>
89	L/0.005
90	L/0.005
103	0.011
104	L/0.005
105	L/0.005
106	L/0.005
107	L/0.005
108	L/0.005
109	L/0.005
110	L/0.005
111	L/0.005
112	L/0.005
113	L/0.005
136	L/0.005
137	L/0.005
138	L/0.005
139	L/0.005
140	L/0.005
141	L/0.005
142	L/0.005

parts per million (mg/L)

<u>Sample #</u>	<u>Total Organic Halogens</u>
15	0.064
16	0.096
17	0.13
18	0.12
19	0.15
20	0.12
21	0.13
27	0.17
28	0.020
29	0.20

parts per million (mg/L)

<u>Sample #</u>	<u>Total Organic Halogens</u>
30	0.30
31	0.16
65	0.14
66	0.16
67	0.045
68	0.13
69	0.20
70	0.20
71	0.09
72	0.09



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LABORATORY NO 73

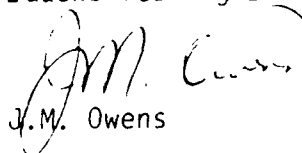
<u>parts per million (mg/L)</u>		<u>parts per million (mg/L)</u>	
<u>Sample #</u>	<u>Total Organic Halogens</u>	<u>Sample #</u>	<u>Total Organic Halogens</u>
73	0.08	96	0.035
74	0.11	125	0.12
77	0.045	126	0.075
78	0.08	127	0.073
79	0.016	128	0.095
80	0.093	129	0.065
81	0.065	130	0.045
82	0.10	131	0.073
91	L/0.010	132	0.045
92	75.	133	0.073
93	0.068	134	0.068
94	L/0.010	135	0.075
95	0.064		

Key

L/ indicates "less than"

Respectfully submitted,

Laucks Testing Laboratories, Inc.

  
J.M. Owens

JMO:veg



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### APPENDIX A

#### Replicate Quality Control Report

<u>Sample</u>	<u>Analyte</u>	<u>Replicate 1</u>	<u>Replicate 2</u>	<u>% Relative Error</u>
83	Cyanide	L/0.005	L/0.005	0.
101	Cyanide	0.006	0.009	(0.003)
44	Phenol	0.063	0.065	3.
108	Phenol	0.050	0.049	2.
142	Phenol	0.052	0.053	2.
2	TOC	86.	85.	1.
22	TOC	95.	92.	3.
54	TOC	24.	23.	4.
59	TOC	20.	20.	0.
62	TOC	6.2	6.8	9.
96	TOX	0.025	0.025	0.
135	TOX	0.075	0.073	(0.003)

parentheses ( ) indicate absolute, rather than relative, error.



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<u>Sample</u>	<u>Analyte</u>	<u>Sample Found</u>	<u>Spike Level</u>	<u>Samp &amp; Spike Found</u>	<u>% Recovery</u>
84	Cyanide	L/0.005	0.050	0.056	108.
44	Phenol	0.013	0.050	0.063	100.
108	Phenol	L/0.005	0.050	0.050	100.
142	Phenol	L/0.005	0.050	0.052	104.
23	TOC	33.	10.	42.	90.
119	TOC	16.	10.	26.	100.
16	TOX	0.024	0.050	0.037	26.
31	TOX	0.032	0.050	0.044	24.
74	TOX	0.021	0.050	0.035	28.



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## Certificate

Chemistry, Microbiology, and Technical Services

CLIENT Science Applications International Corporation  
476 Prospect Street  
La Jolla, CA 92038  
ATTN: Dana Errett

LABORATORY NO. 37750

DATE Feb. 5, 1985

PO #11-350423-38

REPORT ON WATER & SOIL

SAMPLE  
IDENTIFICATION

Submitted 12/11/84 and identified as shown:

TESTS PERFORMED  
AND RESULTS

- |     |                          |                        |
|-----|--------------------------|------------------------|
| 1)  | 35-4679 9-3              | 12/3/84                |
| 2)  | 35-4680 9-4              | 12/3/84                |
| 3)  | 35-4704 9-1              | 12/3/84                |
| 4)  | 35-4705 10-1             | 12/3/84                |
| 5)  | 35-4706 10-2             | 12/3/84                |
| 6)  | 35-4707 10-3             | 12/3/84                |
| 7)  | 35-4708 10-3R            | 12/3/84                |
| 8)  | 35-4709 Boiler Wash      | 12/3/84                |
| 9)  | 35-4710 Field Blank      | 12/3/84                |
| 10) | 35-4711 9-1              | 12/3/84                |
| 11) | 35-4712 9-2              | 12/3/84                |
| 12) | 35-4713 9-3              | 12/3/84                |
| 13) | 35-4714 9-4              | 12/3/84                |
| 14) | 35-4715 10-1             | 12/3/84                |
| 15) | 35-4665 9-1              | 12/3/84                |
| 16) | 35-4666 9-2              | 12/3/84                |
| 17) | 35-4667 9-3              | 12/3/84                |
| 18) | 35-4668 9-4              | 12/3/84                |
| 19) | 35-4669 10-1             | 12/3/84                |
| 20) | 35-4670 10-2             | 12/3/84                |
| 21) | 35-4671 10-3             | 12/3/84                |
| 22) | 35-4672 10-3R            | 12/3/84                |
| 23) | 35-4673 Boiler Wash      | 12/3/84                |
| 24) | 35-4674 Field Blank      | 12/3/84                |
| 25) | 35-4675 10-2             | 12/3/84                |
| 26) | 35-4717 10-3             | 12/3/84                |
| 27) | 35-4718 10-3R            | 12/3/84                |
| 28) | 35-4719 Boiler Wash      | 12/3/84                |
| 29) | 35-4720 Field Blank      | 12/3/84                |
| 30) | 35-4767 812-56 Dover xyz | 12/6/84 0905 mwp005 ET |
| 31) | 35-4768 812-56 Dover xyz | 12/6/84 0900 mwp005 ET |
| 32) | 35-4769 812-56 Dover xyz | 12/6/84 0930 mwp007 ET |
| 33) | 35-4770 812-56 Dover xyz | 12/6/84 0950 mwp008    |
| 34) | 35-4771 812-56 Dover t-1 | 12/6/84 1015 mwp001    |



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35) 85-4772 812-56 t-1 12/6/84 1106 mw--2  
36) 85-4773 812-56 t-1 12/6/84 1145 004  
37) 85-4774 812-56 t-1 12/6/84 1406 101  
38) 85-4775 812-56 t-1 12/6/84 14345 102  
39) 85-4776 812-56 t-1 12/6/84 1530 103  
40) 85-4777 812-56 Dover QA-8 12/6/84 0831  
41) 85-4778 812-56 QA-9 12/6/84 0830  
42) 85-4779 812-56 QA-10 12/6/84 1145  
43) 85-4780 812-56 Dover-T-1 12/6/84 1015 mw001  
44) 85-4781 812-56 Dover-t-1 12/6/84 1100 002  
45) 85-4782 812-56 Dover-T-1 12/6/84 1145 004  
46) 85-4783 812-56 Dover-T-1 12/6/84 1400 101  
47) 85-4784 812-56 Dover-T-1 12/6/84 1445 102  
48) 85-4785 812-56 Dover-T-1 12/6/84 1530 103  
49) 85-4786 812-56 Dover-QA-8 12/6/84 0830  
50) 85-4787 812-56 QA-9 12/6/84 0830  
51) 85-4788 812-56 QA-10 12/6/84 1145  
52) 85-4789 812-56 Dover-T-1 12/6/84 MW001  
53) 85-4790 812-56 Dover-T-1 12/6/84 1100 002  
54) 85-4791 812-56 Dover-T-1 12/6/84 1145 004  
55) 85-4792 812-56 Dover-T-1 12/6/84 1400 101  
56) 85-4793 812-56 Dover-T-1 12/6/84 1445 102  
57) 85-4794 812-56 Dover-T-1 12/6/84 1530 103  
58) 85-4795 812-56 Dover QA-8 12/6/84 0830  
59) 85-4796 812-56 QA-0 12/6/84 1890  
60) 85-4797 812-56 QA-10 12/6/84 1145  
61) 85-4820 812-56 Dover T-1 12/6/84 1015 MW001  
62) 85-4821 812-56 Dover T-1 12/6/84 1145 002  
63) 85-4822 812-56 Dover-T-1 12/6 1145 mw004  
64) 85-4823 812-56 Dover-T-1 12/6 1400 101  
65) 85-4824 812-56 Dover-T-1 12/6 1445 102  
66) 85-4025 812-56 Dover-T-1 12/6 1530 103  
67) 85-4826 812-56 Dover-T-1 12/6 0830 QA-3  
68) 85-4827 812-56 Dover-T-1 12/6 0830 QA-9  
69) 85-4828 812-56 Dover-T-1 12/6 1145 QA-10  
70) 85-4857 12/5/84 Field Blank  
71) 85-4858 12/5/84 35w-1  
72) 85-4859 12/5/84 35w-3  
73) 85-4860 12/5/84 8sw-1  
74) 85-4861 12/5/84 8sw-1R



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75) 35-4862 12/5/84 3sw-2  
76) 35-4864 12/5/84 12/sw-1  
77) 35-4865 12/5/84 12sw-2  
78) 35-4866 12/6/84 8sd-1  
79) 35-4867 12/6/84 8sd-2  
80) 35-4868 12/6/84 9sd-1  
81) 35-4869 12/6/84 9sd-2  
82) 35-4870 12/6/84 10sd-1  
83) 35-4871 12/8/84 10sd-2  
84) 35-4872 12/5 Field Blank  
85) 35-4873 12/5 3sw-1  
86) 35-4874 12/5 8sw-3  
87) 35-4875 12/5 8sw-1  
88) 35-4876 12/5 3sw-1R  
89) 35-4877 12/5 8sw-2  
90) 35-4879 12/5 10sw-1  
91) 35-4880 12/5 12sw-1  
92) 35-4881 12/5 12sw-2  
93) 35-4882 12/5 Field Blank  
94) 35-4883 10/6/84 Field Blank  
95) 35-4884 10/5/84 3sw-1  
96) 35-4885 10/5/84 8sw-1R  
97) 35-4886 10/5/84 8sw-2  
98) 35-4887 10/5/84 9sw-1  
99) 35-4675 12/3/84 7-1  
100) 35-4676 12/3/84 7-2  
101) 35-4677 12/3/84 7-3  
102) 35-4678 12/3/84 9-2  
103) 35-4839 Dover 005c-p6-102 12/6/84 1445 gp-64-0483  
104) 35-5012 hafb qa/qc 12/7/84 1100 Boiler Wash Vickers  
105) 35-5012 hafb qa/qc 12/7/84 Field Blank  
106) 35-5013 hafb sp-7 12/7/84 0848 I-7  
107) 35-5014 hafb 12/7/84 0905 I-3  
108) 35-5015 hafb 12/7/84 0928 I-9  
109) 35-5016 hafb rpta3 12/7/84 1030 I-10  
110) 35-5017 hafb fpta3 12/7/84 1100 I-11  
111) 35-5018 hafb qa-qc 12/7/84 1100 I-11 Rep fota3  
112) 35-5019 hafb fpta3 12/7/84 1140 I-12  
113) 35-5020 hafb qa/qc 12/7/84 1100 Boiler Wash  
114) 35-5021 hafb qa/qc 12/7/84 1100 Field Blank



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115) 85-5022 hafb sp-7 12/7/84 0845 I-7  
116) 85-5023 hafb sp-7 12/7/84 906 I-8  
117) 85-5024 hafb sp-7 12/7/84 0928 I-9  
118) 85-5025 hafb fpta3 12/7/84 1030 I-10  
119) 85-5026 hafb fpta3 12/7/84 1100 I-11  
120) 85-5027 hafb qa/qc 12/7/84 1100 I-11 fpta3 Rep.  
121) 85-4985 3-sw-2 5/Dec/84  
122) 85-4986 3-sw-3 5/Dec/84  
123) 85-5987 3-sw-1 5/Dec/84  
124) 85-4988 9-sw-2 12/6/84  
125) 85-4989 10-sw-1 12/5/84  
126) 85-4990 10-sw-2 12/5/84  
127) 85-4996 Field Blank 12/6/84  
128) 85-5001 Field Blank 12/6/84  
129) 85-4997 3-sw-2 12/5/84  
130) 85-4998 9-sw-1 12/6/84  
131) 85-4999 9-sw-2  
132) 85-5002 8-sw-2 12/5/84  
133) 85-5003 9-sw-2 12/6/84  
134) 85-5004 10-sw-2 12/5/84  
135) 85-4916 Field Blank Sediment  
136) 85-4917 sd-1 12/6/84  
137) 85-4918 3sd-2 12/6/84  
138) 85-4919 3sd-3 12/6/84  
139) 85-4920 12sd-1 12/6/84  
140) 85-4921 12sd-2 12/6/84  
141) 85-4866 8sd-1 12/6/84  
142) 85-5028 hafb fpta-3 11/7/84 1140 I-12  
143) 85-4964 sw003 12/7/84 1040 North Ditch Dover  
144) 85-4965 sw004 12/7/84 1015 North Ditch Dover  
145) 85-4966 sw005 12/7/84 1000 North Ditch Dover  
146) 85-4967 sw006 12/7/84 0930 North Ditch Dover  
147) 85-4968 sw007 12/7/84 0900 North Ditch Dover  
148) 85-4969 sw008 12/7/84 0830 North Ditch Dover  
149) 85-4970 qa-11 12/7/84 0830  
150) 85-4971 sw003 12/7/84 1040 North Ditch Dover  
151) 85-4972 sw004 12/7/84 1015 North Ditch Dover  
152) 85-4973 sw005 12/7/84 1000 North Ditch Dover  
153) 85-4974 sw006 12/7/84 0930 North Ditch Dover  
154) 85-4975 sw007 12/7/84 0900 North Ditch Dover



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155) 85-4976 sw008 12/7/84 0820 North Ditch Dover  
156) 85-4977 qa-11 12/7/84 0550 North Ditch Dover  
157) 85-4935 sw003 12/7/84 1040 North Ditch Dover  
158) 85-4938 sw004 12/7/84 1015 North Ditch Dover  
159) 85-4939 sw005 12/7/84 1000 North Ditch Dover  
160) 85-4940 sw006 12/7/84 0930 North Ditch Dover  
161) 85-4941 sw007 12/7/84 0906 North Ditch Dover  
162) 85-4942 sw008 12/7/84 0820 North Ditch Dover  
163) 85-4943 qa-11 12/7/84 0830 North Ditch Dover  
164) 85-4951 sw003 12/7 1040 North Ditch Dover AFB  
165) 85-4952 sw004 12/7 1015 North Ditch Dover AFB  
166) 85-4953 sw005 12/7 1000 North Ditch Dover AFB  
167) 85-4954 sw006 12/7 0930 North Ditch Dover AFB  
168) 85-4955 sw007 12/7 0900 North Ditch Dover AFB  
169) 85-4956 sw008 12/7 0830 North Ditch Dover AFB  
170) 85-4957 qa-11 12/7 0830 North Ditch Dover AFB  
171) 85-5065 hafb qa/qc 12/10/84 0835 Boiler Wasn Vichers  
172) 85-5066 hafb qa/qc 12/10/84 0835 Blank Vickers  
173) 85-5067 hafb sp-1 12/10/84 0800 I-1 Vickers  
174) 85-5068 hafb qa/qc 12/10/84 0820 replicate sp-1, I-2  
175) 85-5069 hafb sp-1 12/10/84 0820 I-2  
176) 85-5070 hafb sp-1 12/10/84 0850 I-3  
177) 85-4922/ 2 of 2 hafb 12/sd-1 12/6/84  
178) 85-4923 hafb 12 sd-2 12/6/84  
179) 85-4924 hafb 9sd-1 12/6/84  
180) 85-4925 hafb 9sd-2 12/6/84  
181) 85-4926 hafb 10sd-1 12/6/84  
182) 85-4927 hafb 10sd-2 12/6/84  
183) 85-4928 hafb 3sd-1 12/6/84  
184) 85-4929 hafb 3sd-2 12/6/84  
185) 85-4930 hafb 3sd-3 12/6/84  
186) 85-4931 hafb 8sd-1 12/6/84  
187) 85-4932 hafb 8sd-2 12/6/84  
188) 85-4933 hafb Field Blank Sediments 12/6 84



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LABORATORY NO 87750

Note: Water samples were reported in parts per million (mg/L), and soil samples were reported in parts per million (mg/kg), on a dry basis.

Sample #	Total Organic Carbon	Purgeable Organic Carbon	Sample #	Total Organic Carbon	Purgeable Organic Carbon
1	7.4	1.8	99	37.	6.5
2	46.	5.3	100	9.4	5.3
3	47.	6.9	101	21.	8.9
4	16.	6.3	102	5.3	3.3
5	22.	13.	113	1.1	L/0.1
6	77.	3.9	114	1.6	0.2
7	70.	3.5	115	93.	28.
8	1.2	0.2	116	170.	32.
9	5.8	0.2	117	62.	13.
30	5.0	1.0	118	98.	46.
31	3.3	1.5	119	64.	25.
32	20.	14.	120	58.	19.
33	11.	7.2	127	1.0	L/0.1
34	3.0	1.4	129	8.2	1.9
35	3.7	0.6	130	6.3	2.4
36	2.5	0.3	131	7.3	2.0
37	3.4	0.2	142	90.	27.
38	11.	1.6	150	16.	11.
39	74.	32.	151	11.	0.9
40	2.4	0.4	152	3.9	0.5
41	1.2	L/0.1	153	7.7	0.2
42	1.8	0.1	154	5.8	0.3
<del>70</del>	0.8	0.2	155	4.5	0.2
71	8.9	1.1	156	0.6	L/0.1
72	25.	0.9	138*	0.4	L/0.1
73	6.2	0.3			
74	3.0	0.3			
75	23.	1.2			
76	2.4	0.7			
77	3.0	0.7			



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<u>Sample #</u>	<u>Cyanide, parts per million</u>
52	L/0.005
53	L/0.005
54	L/0.005
55	L/0.005
56	L/0.005
57	L/0.005
58	L/0.005
59	L/0.005
60	L/0.005
103	L/0.005
164	L/0.005
165	L/0.005
166	L/0.005
167	L/0.005
168	L/0.005
169	L/0.005
170	L/0.005
171	L/0.005
172	L/0.005
173	L/0.005
174	L/0.005
175	L/0.005
176	L/0.005



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<u>parts per million</u>		<u>parts per million</u>		<u>%</u>
<u>Sample #</u>	<u>Phenols</u>	<u>Sample #</u>	<u>Phenols</u>	<u>Total Solids</u>
15	L/0.005	98	L/0.005	---
16	L/0.005	121**	L/0.005	---
17	L/0.005	122	L/0.005	---
18	L/0.005	123**	0.008	---
19	L/0.005	124	L/0.005	---
20	L/0.005	125	L/0.005	---
21	L/0.005	126	L/0.005	---
22	L/0.005	157	L/0.005	---
23	0.006	158	L/0.005	---
24	L/0.005	159	L/0.005	---
61	L/0.005	160	L/0.005	---
62	L/0.005	161	L/0.005	---
63	L/0.005	162	L/0.005	---
64	L/0.005	163	L/0.005	---
65	0.016	179	0.2	28.1
66	6.3	180	1.0	28.4
67	L/0.005	181	L/0.005	71.3
68	L/0.005	182	L/0.005	70.5
69	L/0.005	183	0.4	50.5
93**	0.007	184	0.6	53.6
94**	0.007	185	L/0.005	73.6
95	L/0.005	186	0.4	72.5
96**	0.010	187	L/0.2	26.1
97**	0.015	188**	0.010	---



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<u>parts per million</u>			<u>parts per million</u>		
<u>Sample #</u>	<u>Total Organic Halogens</u>	<u>Total Solids</u>	<u>Sample #</u>	<u>Total Organic Halogens</u>	<u>Total Solids</u>
10	0.23	---	90	0.33	---
11	0.24	---	91	0.45	---
12	0.23	---	92	0.38	---
13	0.20	---	104	0.01	---
14	0.19	---	105	0.01	---
25	1.4	---	106	0.01	---
26	0.20	---	107	0.02	---
27	0.55	---	108	0.03	---
28	0.49	---	109	L/0.010	---
29	0.20	---	110	0.02	---
43	0.33	---	111	0.02	---
44	0.26	---	112	0.02	---
45	0.26	---	128	0.05	---
46	0.32	---	132	0.11	---
47	0.46	---	133	0.05	---
48	7.5	---	134	0.07	---
49	0.33	---	135	0.37	---
50	0.23	---	136	2.4	63.0
51	0.23	---	137	4.1	73.1
73	1.6	81.9	138	2.5	74.2
79	1.3	71.6	139	2.4	62.3
30	2.3	69.8	140	2.4	76.2
81	5.1	31.2	141	0.21	---
82	2.1	75.0	143	2.6	77.3
83	2.2	83.6	144	0.11	---
84	0.25	---	145	0.06	---
35	0.16	---	146	0.09	---
36	0.35	---	147	0.06	---
37	0.30	---	148	0.09	---
38	0.23	---	149	0.03	---
39	0.14	---			



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### Key

L/ indicates "less than".

\* sample was received unpreserved and with headspace.

\*\* samples for phenols were received unpreserved.

Respectfully submitted,

Laucks Testing Laboratories, Inc.

Mike Nelson

MN:veg



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### APPENDIX A

### Replicate Quality Control Report

Sample	Analyte	Replicate 1	Replicate 2	% Relative Error	Control Limits
52	Cyanide	L/0.005	L/0.005	0.	0-10
60		L/0.005	L/0.005	0.	0-10
164		0.053	0.055	4.	0-10
176	Phenol	0.056	0.055	2.	0-10
65		0.053	0.066	6.	0-10
126		0.051	0.051	0.	0-10
163		0.050	0.050	0.	0-10
179		2.6	1.6	48.	0-10
1	TOC	7.2	7.4	3.	0-9
34		3.0	2.9	3.	0-9
10	TOX	0.224	0.228	2.	*
43		0.33	0.37	11.	*
85		0.16	0.19	17.	*
104		0.014	0.014	0.	*
132		0.115	0.105	9.	*
80	TOC	0.160	0.150	6.	*
73		6.2	5.3	7.	0-9
114		1.6	1.5	6.	0-9
119		64.	64.	0.	0-9
142		90.	89.	1.	0-9

\* No limits established



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### APPENDIX B

### Spike Quality Control Report

<u>Sample</u>	<u>Analyte</u>	<u>Sample Found</u>	<u>Spike Level</u>	<u>Samp &amp; Spike Found</u>	<u>% Recovery</u>	<u>Control Limits</u>
53	Cyanide	L/0.005	0.050	0.053	106.	*
164		L/0.005	0.050	0.053	106.	*
176		L/0.005	0.050	0.055	110.	*
65		0.016	0.050	0.066	100.	*
126		L/0.005	0.050	0.051	102.	*
163	Phenol	L/0.005	0.050	0.050	100.	*
179		0.2	1.8	1.6	78.	*
1		7.4	10.	18.	106.	83-120
11		0.048	0.050	0.048	9.	*
44		0.026	0.050	0.048	44.	*
86	TOC	0.035	0.050	0.052	34.	*
105		0.004	0.050	0.040	73.	*
133		0.01	0.050	0.016	14.	*
128		0.01	0.050	0.045	62.	*
79		0.026	0.050	0.064	76.	*
73	TOX	6.2	10.	17.	108.	83-120
130		6.3	10.	17.	107.	83-120

\* No limits established



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## Certificate

CLIENT Science Applications International Corporation  
476 Prospect Street  
La Jolla, CA 92038  
ATTN: Dana Errett

LABORATORY NO. 87860-a

DATE Feb. 12, 1985

PO #11-850423-38

REPORT ON WATER & SOIL

### SAMPLE IDENTIFICATION

Submitted 12/19/84 and identified as shown:

### TESTS PERFORMED AND RESULTS

- 1) 85-5342 Dover AFB SW001B 12/14/84 1100
- 2) 85-5343 Dover AFB 002B 12/14/84 1100
- 3) 85-5344 Dover AFB 001B 12/14/84 1100
- 4) 85-5345 Dover AFB 002B 12/14/84 1100
- 5) 85-5346 Dover AFB SL-13 12/13/84 0900 ET
- 6) 85-5347 Dover AFB SL-14 12/13/84 0900 ET
- 7) 85-5348 Dover AFB SL-15 12/13/84 0900 ET
- 8) 85-5349 Dover AFB SL-16 12/13/84 0900 ET
- 9) 85-5350 Dover AFB QA-20 12/14/84 0900 ET
- 10) 85-5351 Dover AFB SD-020 12/14/84 0900 ET
- 11) 85-5352 Dover AFB SD-021 12/14/84 0900 ET
- 12) 85-5353 Dover AFB SD-022 12/14/84 0900 ET
- 13) 85-5354 Dover AFB SD-023 12/14/84 0900 ET
- 14) 85-5355 Dover AFB SD-024 12/14/84 0900 ET
- 15) 85-5356 Dover AFB SD-025 12/14/84 0900 ET
- 16) 85-5357 Dover AFB SD-026 12/14/84 0900 ET
- 17) 85-5358 Dover AFB SD-027 12/14/84 0900 ET
- 18) 85-5359 Dover AFB SW-009 12/14/84 ET
- 19) 85-5360 Dover AFB SW-010 12/14/84 ET
- 20) 85-5361 Dover AFB SW-016 12/14/84 ET
- 21) 85-5362 Dover AFB QA-18 12/14/84 ET
- 22) 85-5363 Dover AFB QA-19 12/14/84 ET
- 23) 85-5364 Dover AFB SW-009 12/14/84 ET
- 24) 85-5365 Dover AFB SW-010 12/14/84 ET
- 25) 85-5366 Dover AFB QA-18 12/14/84 ET
- 26) 85-5367 Dover AFB QA-19 12/14/84 ET
- 27) 85-5368 Dover AFB 0052-NA-016 6N-84-0538 12/14/84 ET
- 28) 85-5185 Dover AFB SW-001 12/12/84 ET
- 29) 85-5186 Dover AFB SW-002 12/12/84 ET
- 30) 85-5187 Dover AFB QA-15 12/12/84 ET 0930
- 31) 85-5188 Dover AFB QA-16 12/12/84 0930 ET
- 32) 85-5189 Dover AFB SW-001 12/12/84 0930 ET
- 33) 85-5190 Dover AFB SW-002 12/12/84 ET
- 34) 85-5191 Dover AFB QA15 12/12/84 0930 ET



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35) 85-5192 Dover AFB Qa-16 12/12/84 0930 ET  
36) 85-5197 Dover AFB SW-001 12/12/84 0930 ET  
37) 85-5198 Dover AFB SW-002 12/12/84 ET  
38) 85-5199 Dover AFB QA-15 12/12/84 0930 ET  
39) 85-5200 Dover AFB QA-16 12/12/84 0930 ET  
40) 85-5201 Dover AFB SW-001 12/12/84 0930 ET  
41) 85-5202 Dover AFB SW-002 12/12/84 ET  
42) 85-5703 Dover AFB QA-15 12/12/84 0930 ET  
43) 85-5204 Dover AFB QA-16 12/12/84 0930 ET  
44) 85-5205 Dover AFB SD-1 12/12/84 ET  
45) 85-5206 Dover AFB SD-2 12/12/84 0930 ET  
46) 85-5207 Dover AFB QA-17 12/12/84 1000 ET  
47) 85-5089 Dover AFB MW-024 12/11/84 1030 ET  
48) 85-5090 Dover AFB MW-025 12/11/84 1100 ET  
49) 85-5091 Dover AFB MW-027 12/11/84 1430 ET  
50) 85-5092 Dover AFB QA-12 12/11/84 ET  
51) 85-5093 Dover AFB QA-13 12/11/84 ET  
52) 85-5094 Dover AFB QA-14 12/11/84 1430 ET  
53) 85-5107 Dover AFB MW-018 12/11/84 0900 ET  
54) 85-5108 Dover AFB MW-019 12/11/84 0930 ET  
55) 85-5109 Dover AFB MW-020 12/11/84 1000 ET  
56) 85-5110 Dover AFB MW-024 12/11/84 1030 ET  
57) 85-5111 Dover AFB MW-025 12/11/84 1100 ET  
58) 85-5112 Dover AFB MW-027 12/11/84 1430 ET  
59) 85-5113 Dover AFB QA-12 12/11/84 ET  
60) 85-5114 Dover AFB QA-13 12/11/84 ET  
61) 85-5115 Dover AFB QA-14 12/11/84 1430 ET  
62) 85-5122 Dover AFB MW-015 12/11/84 0900 ET  
63) 85-5123 Dover AFB MW-019 12/11/84 0930 ET  
64) 85-5124 Dover AFB MW-020 12/11/84 1000 ET  
65) 85-5125 Dover AFB MW-024 12/11/84 1030 ET  
66) 85-5126 Dover AFB MW-025 12/11/84 1100 ET  
67) 85-5127 Dover AFB MW-027 12/11/84 1430 ET  
68) 85-5128 Dover AFB MW-001 12/11/84 ET  
69) 85-5129 Dover AFB MW-002 12/11/84 1330 ET  
70) 85-5130 Dover AFB MW-003 12/11/84 1400 ET  
71) 85-5131 Dover AFB QA-12 12/11/84 ET  
72) 85-5132 Dover AFB QA-13 12/11/84 ET  
73) 85-5133 Dover AFB QA-14 12/11/84 1430 ET  
74) 85-5143 Dover AFB MW-024 12/11/84 1030 ET



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75) 35-5144 Dover AFB MW-025 12/11/84 1100 ET  
76) 35-5145 Dover AFB MW-027 12/11/84 ET  
77) 35-5146 Dover AFB QA-12 12/11/84 ET  
78) 35-5147 Dover AFB QA-13 12/11/84 ET  
79) 35-4148 Dover AFB QA-14 12/11/84 1430 ET  
80) 35-5281 Dover AFB SD-003 12/13/84 1130 ET  
81) 35-5282 Dover AFB SD-004 12/13/84 1115 ET  
82) 35-5283 Dover AFB SD-005 12/13/84 1050 ET  
83) 35-5284 Dover AFB SD-006 12/13/84 1000 ET  
84) 35-5285 Dover AFB SD-007 12/13/84 1035 ET  
85) 35-5286 Dover AFB SD-008 12/13/84 0930 ET  
86) 35-5287 Dover AFB SD-9 12/12/84  
87) 35-5288 Dover AFB SD-10 12/12/84  
88) 35-5289 Dover AFB SD-11 12/12/84  
89) 35-5290 Dover AFB SD-12 12/12/84  
90) 35-5338 Dover AFB SD-12 12/12/84  
91) 35-5339 Dover AFB SW-012 12/12/84 ET  
92) 35-5340 Dover AFB SW-013 12/12/84 ET  
93) 35-5341 Dover AFB SW-014 12/12/84 ET  
94) 35-5297 HAFB QA/QC 12/12/84 1300 Bailer Wash Vickers  
95) 35-5298 HAFB QA/QC 12/12/84 1300 Blank Vickers  
96) 35-5299 HAFB QA/QC 12/12/84 1300 Replicate well field #1 5530 Vickers  
97) 35-5300 HAFB well field #1 12/12/84 well 5-530 Vickers  
98) 35-5301 HAFB Well field #2 12/12/84 1410 well 10 Vickers  
99) 35-5312 HAFB QA/QC 12/12/84 0920 Blank Vickers  
100) 35-5313 HAFB QA/QC 12/12/84 0920 Bailer Wash Vickers  
101) 35-5314 HAFB Well field #2 12/12/84 1410 well #10 Vickers  
102) 35-5315 HAFB SP-4 12/12/84 0955 I-4 Vickers  
103) 35-5316 HAFB SP-4 12/12/84 0900 I-5 Vickers  
104) 35-5317 HAFB SP-4 12/12/84 0920 I-6 Vickers  
105) 35-5318 HAFB QA/QC 12/12/84 0920 Replicate I-6 Vickers  
106) 35-5319 HAFB SP-6 12/12/84 0830 I-14 Vickers  
107) 35-5320 HAFB QA/QC 12/12/84 0920 Bailer Wash Vickers  
108) 35-5321 HAFB QA/QC 12/12/84 0920 Blank Vickers  
109) 35-5322 HAFB Well field #2 12/12/84 1410 Well #10 Vickers  
110) 35-5323 HAFB SP-4 12/12/84 0955 I-4 Vickers  
111) 35-5324 HAFB SP-4 12/12/84 0900 I-5 Vickers  
112) 35-5325 HAFB SP-4 12/12/84 0920 I-6 Vickers  
113) 35-5326 HAFB QA/QC 12/12/84 0920 Replicate I-6 Vickers  
114) 35-5327 HAFB SP-6 12/12/84 0830 I-14 Vickers



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<u>Sample</u>	<u>Total Organic Carbon</u>	<u>Purgeable Organic Carbon</u>
	<u>parts per million (mg/L)</u>	
18	3.0	0.2
19	2.5	0.2
20	29.	0.2
21	12.	L/0.1
22	18.	0.2
27	13.	0.1
36	300.	58.
37	110.	16.
38	3.2	0.7
39	120.	11.
62	1.6	0.2
63	1.3	0.6
64	8.9	1.8
65	3.0	1.0
66	1.9	1.1
67	3.8	2.3
68	2.1	0.7
69	4.9	2.1
70	32.	1.6
71	0.4	0.1
72	0.7	L/0.1
73	4.7	2.2
90	4.4	0.8
91	4.9	0.2
92	4.1	L/0.1
93	5.3	L/0.1
99	0.4	L/0.1
100.	0.4	L/0.1
101	5.4	4.8
102	37.	26.
103	19.	11.
104	10.	6.1
105	12.	7.4
106	47.	30.



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LABORATORY NO 87860-a

Sample #	Cyanide, parts per million (mg/kg), dry basis
1	0.013
2	0.010
28*	0.010
29*	0.013
30*	L/0.005
31*	0.013
47	0.006
48	L/0.005
49	0.006
50	0.006
51	0.010
52	0.006
94	0.007
95	0.007
96	0.009
97	0.012
98	0.007



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# Laucks

## Testing Laboratories, Inc.

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Chemistry, Microbiology, and Technical Services



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LABORATORY NO 87860-a

	<u>parts per million (mg/L)</u>				
	<u>3</u>	<u>4</u>	<u>32*</u>	<u>33*</u>	<u>34*</u>
Phenol	44.	3.1	34.	0.026	L/0.005
	<u>35*</u>	<u>74</u>	<u>75</u>	<u>76</u>	<u>77</u>
Phenol	0.056	L/0.005	L/0.005	L/0.005	L/0.005
	<u>78</u>	<u>79</u>			
Phenol	0.006	L/0.005			

<u>Sample #</u>	<u>% Total Solids</u>	<u>Sample #</u>	<u>% Total Solids</u>
5	81.6	44	60.0
6	80.9	45	83.9
7	81.1	46	86.9
8	79.2	80	84.6
9	70.0	81	82.2
10	68.4	82	79.6
11	68.4	83	75.9
12	62.9	84	82.6
13	77.4	85	28.3
14	65.1	86	75.6
15	71.3	87	70.9
16	76.7	88	52.8
17	79.3	89	57.5



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LABORATORY NO 87860-a

Note: Balance of results to follow upon completion.

### Key

L/ = "less than"  
\* = samples were received unpreserved

Respectfully submitted,

Laucks Testing Laboratories, Inc.

J.M. Owens

JMO:veg



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#### APPENDIX A

#### Replicate Quality Control Report

<u>Sample</u>	<u>Analyte</u>	<u>Replicate 1</u>	<u>Replicate 2</u>	<u>% Relative Error</u>	<u>Control Limits</u>
30	Cyanide	0.056	0.060	7.	0-13
98	Cyanide	0.064	0.058	10.	0-13
84	Phenol	0.049	0.048	2.	0-10
20	TOC	29.	31.	7.	0-9
63	TOC	1.3	1.4	7.	0-9
71	TOC	0.4	0.4	0.	0-9
103	TOC	19.	19.	0.	0-9



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LABORATORY NO 87860-a

### APPENDIX B

### Spike Quality Control Report

<u>Sample</u>	<u>Analyte</u>	<u>Sample Found</u>	<u>Spike Level</u>	<u>Samp &amp; Spike Found</u>	<u>% Recovery</u>	<u>Control Limit</u>
30	Cyanide	L/0.005	0.050	0.056	112.	72-114
98	Cyanide	0.007	0.050	0.058	102.	72-114
34	Phenol	L/0.005	0.050	0.049	98.	
21	TOC	12.	10.	23.	110.	83-120
73	TOC	4.7	10.	15.	103.	83-120



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## Certificate

CLIENT Science Applications International Corporation  
476 Prospect Street  
La Jolla, CA 92038  
ATTN: Dana Errett

LABORATORY NO 87860-b

DATE Feb. 19, 1985

PO #11-850423-38

REPORT ON WATER & SOIL

### SAMPLE IDENTIFICATION

Samples are identified as shown in report #87860-a,  
dated Feb. 12, 1985.

### TESTS PERFORMED AND RESULTS

#### Total Organic Halogens as Cl

Sample Number      parts per million (mg/kg), dry basis

5	2.9
6	1.8
7	1.1
8	0.26
9	0.96
10	1.1
11	0.98
12	0.97
13	0.63
14	0.89
15	0.65
16	0.53
17	0.24
44	16.
45	0.12
46	0.18
80	0.15
91	L/0.1
82	0.31
83	0.20
84	0.27
85	1.8
86	2.1
87	3.1
88	0.89
89	0.59



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## Certificate

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LABORATORY NO 87860-b

### Total Organic Halogens as Cl

<u>Sample Number</u>	<u>parts per million (mg/L)</u>
23	0.094
24	0.066
25	0.066
26	0.094
40	1.2
41	1.2
42	0.10
43	1.5
53	0.12
54	0.13
55	0.12
56	0.10
57	1.0
58	1.4
59	0.10
60	0.10
61	8.2
107	0.041
108	0.039
109	0.039
110	0.044
111	0.10
112	0.049
113	0.052
114	0.036

### Key

L/ = less than

Respectfully submitted,

Laucks Testing Laboratories, Inc.

  
J.M. Owens

JMO:veg



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## Certificate

CLIENT Science Applications International Corporation  
476 Prospect Street  
La Jolla, CA 92038  
ATTN: Dana Errett

LABORATORY NO 87905-a

DATE Feb. 12, 1985

PO #11-850423-38

REPORT ON WATER & SOIL

### SAMPLE IDENTIFICATION

Submitted 12/21/84 and identified as shown:

### TESTS PERFORMED AND RESULTS

- 1) 85-5441 HAFB FPTA-2 12/13/84 1355 248 Vickers
- 2) 85-5442 HAFB FPTA-2 12/13/84 1420 I-13 Vickers
- 3) 85-5443 HAFB SP-5 12/13/84 1435 1-19 Vickers
- 4) 85-5444 HAFB QA/QC 12/13/84 1435 Bailer Wash Vickers
- 5) 85-5445 HAFB QA/QC 12/13/84 1235 Replicate 1-19 Vickers
- 6) 85-5446 HAFB QA/QC 12/13/84 1435 Blank Vickers
- 7) 85-5447 HAFB SP-5 12/13/84 1500 I-18 Vickers
- 8) 85-5448 HAFB FPTA-2 12/13/84 1355 248 Vickers
- 9) 85-5449 HAFB FPTA-2 12/13/84 1420 I-13 Vickers
- 10) 85-5450 HAFB SP-5 12/13/84 1435 I-19 Vickers
- 11) 85-5451 HAFB QA/QC 12/13/84 1435 Bailer Wash Vickers
- 12) 85-5452 HAFB QA/QC 12/13/84 1435 Replicate I-19 Vickers
- 13) 85-5453 HAFB QA/QC 12/13/84 1435 Blank Vickers
- 14) 85-5454 HAFB SP-5 12/13/84 1500 I-18 Vickers
- 15) 85-5071 HAFB SP-1 12/10/84 0905 SL-1 Vickers
- 16) 85-5072 HAFB SP-1 12/10/84 0910 SL-2 Vickers
- 17) 85-5073 HAFB SP-1 12/10/84 0920 SL-3 Vickers
- 18) 85-5074 HAFB SP-1 12/10/84 0920 SL-4 Vickers
- 19) 85-5075 HAFB QA/QC 12/10/84 0930 SP-1, SL-4 Vickers
- 20) 85-5302 HAFB SP-1 12/12/84 1200 SD-2 Vickers
- 21) 85-5303 HAFB SP-1 12/12/84 1150 SD-1 Vickers
- 22) 85-5304 HAFB QA/QC 12/12/84 1200 SP-1, SD02 Vickers
- 23) 85-4054 HAFB 55 1-SB-1 11/6/84 1009 2.5'-4.0' BLS Vickers
- 24) 85-4055 1-SB-2 11/6/84 1015 4.0-5.3 BLS interval
- 25) 85-4056 1-SB-3 11/6/84 0929 4.5-5.0 BLS interval Refusal @ 5
- 26) 85-4057 7-SB-2R 11/6/84 1428
- 27) 85-4058 12-SB-1 11/6/84 1310
- 28) 85-4059 12-SB-2 11/6/84 1159
- 29) 85-4914 10-1DR 11/6/84 Drumard Cuttings from well
- 30) 85-4915 4-3DR Drumard Cuttings from well
- 31) 85-5208 Dover AFB SD-1 12/12/84 EFT
- 32) 85-5209 Dover AFB SD-2 12/12/84 EFT
- 33) 85-5210 Dover AFB QA-17 12/12/84 EFT 1000
- 34) 85-5218 Dover AFB SD-9 12/12/84 EFT



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35) 85-5219 Dover AFB SD-10 12/12/84 EFT  
36) 85-5220 Dover AFB SD-11 12/12/84 EFT  
37) 85-5221 Dover AFB SD-12 12/12/84 EFT  
38) 85-5291 Dover AFB 0052-50-003 GL-84 12/13/84 1130 EFT  
39) 85-5292 Dover AFB 0052-50-004 GL-84 12/13/84 1115 EFT  
40) 85-5293 Dover AFB 0052-50-005 GL-84 12/13/84 1050 EFT  
41) 85-5294 Dover AFB 0052-50-006 GL-84 12/13/84 1000 EFT  
42) 85-5295 Dover AFB 0052-50-007 GL-84 12/13/84 0935 EFT  
43) 85-5296 Dover AFB 0052-50-008 GL-84 12/13/84 0930 EFT  
44) 85-5385 Dover AFB SD-17 12/14/84 9:05 EFT  
45) 85-5386 Dover AFB SD-019 12/14/84  
46) 85-5391 Dover AFB SL-13 12/13/84 EFT  
47) 85-5392 Dover AFB SL-14 12/13/84 EFT  
48) 85-5393 Dover AFB SL-15 12/13/84 EFT  
49) 85-5394 Dover AFB SL-16 12/13/84 EFT  
50) 85-5395 Dover AFB QA-20 12/14/84 0900 EFT  
51) 85-5396 Dover AFB SD-020 12/14/84 0900 EFT  
52) 85-5397 Dover AFB SD-021 12/14/84 0900 EFT  
53) 85-5398 Dover AFB SD-022 12/14/84 0900 EFT  
54) 85-5399 Dover AFB SD-023 12/14/84 0900 EFT  
55) 85-5400 Dover AFB SD-024 12/14/84 0900 EFT  
56) 85-5401 Dover AFB SD-025 12/14/84 0900 EFT  
57) 85-5402 Dover AFB SD-026 12/14/84 0900 EFT  
58) 85-5403 Dover AFB SD-027 12/14/84 0900 EFT



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LABORATORY NO 87905-a

Samples 29 & 30 were analyzed in accordance with 40 CFR, Part 261.24 for EP Toxicity, with results as shown below:

	<u>concentration, mg/L (parts per million)</u>		
	<u>29</u>	<u>30</u>	<u>MCL</u>
Arsenic	L/0.1	L/0.1	5.0
Barium	1.0	0.5	100.
Cadmium	0.04	0.04	1.0
Chromium	L/0.1	0.1	5.0
Lead	0.4	0.6	5.0
Mercury	L/0.005	L/0.005	0.2
Selenium	L/0.1	L/0.1	1.0
Silver	L/0.1	L/0.1	5.0

Samples were further tested as follows:

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	<u>parts per million (mg/L)</u>						
Total Organic Carbon	2.2	5.6	7.0	0.6	9.4	1.2	22.
Purgeable Organic Carbon	0.5	1.9	3.8	0.1	5.9	0.3	14.

<u>Total Organic Carbon, %</u>						
<u>23</u>	<u>24</u>	<u>25</u>	<u>26</u>	<u>27</u>	<u>28</u>	<u>31</u>
2.0	L/0.1	0.6	1.0	0.6	0.6	3.2
<u>32</u>	<u>33</u>	<u>34</u>	<u>35</u>	<u>36</u>	<u>37</u>	<u>38</u>
1.2	L/0.1	0.3	1.8	2.3	1.3	0.3



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### Total Organic Carbon, %

<u>39</u>	<u>40</u>	<u>41</u>	<u>42</u>	<u>43</u>	<u>44</u>	<u>45</u>
0.9	0.1	2.2	L/0.1	4.4	0.2	0.9
<u>46</u>	<u>47</u>	<u>48</u>	<u>49</u>	<u>50</u>	<u>51</u>	<u>52</u>
0.3	1.1	1.4	0.3	4.1	2.3	4.8
<u>53</u>	<u>54</u>	<u>55</u>	<u>56</u>	<u>57</u>	<u>58</u>	
2.4	4.2	3.4	4.6	1.3	1.5	

### Cyanide, parts per million (mg/kg), dry basis

### Total Solids, %

### Sample #

15	1.3	72.9
16	0.6	91.1
17	0.7	82.1
18	0.8	73.3
19	0.8	72.2
20	3.0	83.8
21	0.6	87.0
22	3.9	84.0
31	0.2	80.6
32	0.2	83.9
33	0.2	84.9
38	0.2	75.8
39	0.7	78.1
40	0.2	79.4



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LABORATORY NO 87905 - a

<u>Sample #</u>	<u>Cyanide, parts per million (mg/kg), dry basis</u>	<u>Total Solids, %</u>
41	0.8	57.3
42	0.1	78.7
43	1.1	30.0
46	0.3	83.0
47	0.4	82.8
48	0.4	79.0
49	0.1	70.0

	<u>parts per million (mg/kg), dry basis</u>				
	<u>31</u>	<u>32</u>	<u>33</u>	<u>38</u>	<u>39</u>
Phenol	3.2	0.1	L/0.1	0.3	L/0.1
	<u>40</u>	<u>41</u>	<u>42</u>	<u>43</u>	<u>46</u>
Phenol	L/0.1	0.1	L/0.1	0.5	L/0.1
	<u>47</u>	<u>48</u>	<u>49</u>		
Phenol	L/0.1	0.9	0.8		



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LABORATORY NO 87905-a

	<u>parts per million</u>			
	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>
Total Organic Halogens as Cl	0.025	2.2	0.026	0.020
	<u>12</u>	<u>13</u>	<u>14</u>	
Total Organic Halogens as Cl	0.025	0.018	0.046	
	<u>27</u>	<u>28</u>		
Total Organic Halogens as Cl, dry basis	0.10	0.10		

### Key

L/ = "less than"

MCL = Maximum Contamination allowed per regulation.

Note: Balance of results to follow upon completion.

Respectfully submitted,

Laucks Testing Laboratories, Inc.

*J.M. Owens*  
J.M. Owens

JMO:veg



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## Certificate

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LABORATORY NO 87905-a

### APPENDIX A

#### Replicate Quality Control Report

<u>Sample</u>	<u>Analyte</u>	<u>Replicate 1</u>	<u>Replicate 2</u>	<u>% Relative Error</u>	<u>Control Limits</u>
16	Cyanide	1.4	1.3	7.	0-10
1	TOC	2.0	2.2	10.	*
31	Phenol	9.4	9.3	1.	0-10
49	TOC	0.3	0.3	(0.)	*
8	TOX	0.025	0.027	(0.002)	*
10 spike	TOX	0.042	0.038	(0.004)	*
34	TOC	0.3	0.4	(0.1)	*
37	TOC	1.3	1.6	21.	*
43	TOC	4.4	4.7	6.6	*
52	TOC	4.8	5.5	14.	*
58	TOC	1.6	1.5	6.4	*

parentheses ( ) indicate absolute, rather than relative, error.

\* indicates none established



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LABORATORY NO 87905 - a

### APPENDIX B

#### Spike Quality Control Report

<u>Sample</u>	<u>Analyte</u>	<u>Sample Found</u>	<u>Spike Level</u>	<u>Samp &amp; Spike Found</u>	<u>% Recovery</u>
16	Cyanide	0.6	1.0	1.4	80.
1	TOC	2.2	10.	13.	108.
31	Phenol	3.2	6.2	9.4	100.
10	TOX	0.026	0050	0.042	32.
10	TOX	0.026	0.050	0.038	24.



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# Laucks

## Testing Laboratories, Inc.

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## Certificate

Chemistry, Microbiology, and Technical Services

CLIENT Science Applications International Corporation  
476 Prospect Street  
La Jolla, CA 92038  
ATTN: Dana Errett

LABORATORY NO 88149

DATE Feb. 13, 1985

PO #11-850423-38

REPORT ON WATER & SOIL

SAMPLE IDENTIFICATION Submitted 1/17/85 and identified as shown:

TESTS PERFORMED  
AND RESULTS

- 1) 85-4029
- 2) 85-4030
- 3) 85-4031
- 4) 85-4032
- 5) 85-4033
- 6) 85-4034
- 7) 85-4035
- 8) 85-4036
- 9) 85-4060
- 10) 85-4061
- 11) 85-4062
- 12) 85-4063
- 13) 85-4064
- 14) 85-5687 2-812-06-18C-56 Dover AFB DR-1 1/9/85 Drum Cuttings
- 15) 85-5688 2-812-06-18C-56 Dover AFB DR-1 1/9/85 Drum Cuttings

Sample #15 was analyzed in accordance with 40 CFR, Part 261.24 for EP Toxicity, with results as shown below:

concentration, mg/L (parts per million)

	<u>15</u>	<u>MCL</u>
Arsenic	L/0.1	5.0
Barium	L/0.5	100.
Cadmium	L/0.02	1.0
Chromium	L/0.1	5.0
Lead	L/0.2	5.0
Mercury	L/0.005	0.2
Selenium	L/0.1	1.0
Silver	L/0.1	5.0



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# Laucks

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940 South Harney Street, Seattle, Washington 98108 (206) 767-5060

Chemistry, Microbiology, and Technical Services



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LABORATORY NO 88149

Samples were further tested as follows:

	<u>parts per million (mg/kg), dry basis</u>					
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
Total Organic Halogens as Cl	3.5	2.6	2.5	4.4	2.4	3.8
	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>
Total Organic Halogens as Cl	3.3	3.4	4.0	2.4	2.2	2.8
	<u>%, dry basis</u>					
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
Total Organic Carbon	0.4	L/0.1	L/0.1	1.2	1.3	1.5
	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>
Total Organic Carbon	3.5	1.6	2.8	3.2	4.5	3.6
	<u>%</u>					
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
Total Solids	82.4	81.9	87.0	81.0	86.0	81.2
	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>
Total Solids	90.0	79.8	80.9	92.0	90.9	89.0



This report is submitted for the exclusive use of the person, partnership, or corporation to whom it is addressed. Subsequent use of the name of this company or any member of its staff in connection with the advertising or sale of any product or process will be granted only on contract. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.



# Laucks

## Testing Laboratories, Inc.

940 South Harney Street, Seattle, Washington 98108 (206) 767-5060

Chemistry, Microbiology and Technical Services



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LABORATORY NO 88149

13

parts per million (mg/L)

Total Organic Halogens as Cl  
Total Organic Carbon

L/0.02  
1.6

Sample #14 was tested for ignitability with the following result:

The sample is a solid and is not capable under standard conditions of causing fire through friction, absorption of moisture, or spontaneous chemical changes. The sample will not ignite or burn even when exposed to heat and flame.

### Key

L/ = "less than"

MCL = Maximum Contamination allowed per regulation.

Respectfully submitted,

Laucks Testing Laboratories, Inc.

*J. M. Owens*  
J.M. Owens

JMO:veg



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# Laucks

Testing Laboratories, Inc.

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Chemistry, Microbiology, and Technical Services



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PAGE NO 4

LABORATORY NO 88149

## APPENDIX A

### Replicate Quality Control Report

<u>Sample</u>	<u>Analyte</u>	<u>Replicate 1</u>	<u>Replicate 2</u>	<u>% Relative Error</u>
2	TOX	2.4	2.6	3.
2	TOC	L/0.1	L/0.1	0.
8	TOC	1.6	1.6	0.



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LABORATORY NO 88149

### APPENDIX B

### Spike Quality Control Report

<u>Sample</u>	<u>Analyte</u>	<u>Sample Found</u>	<u>Spike Level</u>	<u>Samp &amp; Spike Found</u>	<u>% Recovery</u>
2	TOX	2.6	6.1	9.0	105.



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# Laucks

## Testing Laboratories, Inc.

940 South Harney Street, Seattle, Washington 98108 (206) 767-5060

Chemistry, Microbiology and Technical Services



## Certificate

CLIENT Science Applications International Corporation  
476 Prospect Street  
La Jolla, CA 92038  
ATTN: Dana Errett

LABORATORY NO 88149-b

DATE Feb. 20, 1985

PO #11-850423-38

REPORT ON SOIL

### SAMPLE IDENTIFICATION

Submitted 1/17/85 and identified as shown in our report #88149,  
dated Feb. 13, 1985.

### TESTS PERFORMED AND RESULTS

Sample #15 was analyzed in accordance with 40 CFR, Part 261.24 for EP  
Toxicity, with results as shown below:

### concentration, mg/L (parts per million)

	<u>15</u>	<u>MCL</u>
Lindane	L/0.0005	0.4
Endrin	L/0.0005	0.02
Methoxychlor	L/0.001	10.0
Toxaphene	L/0.005	0.5
2,4-D	L/0.001	10.0
2,4,5-TP	L/0.001	1.0

### Key

L/ = "less than"

MCL = Maximum Contamination allowed per regulation.

Respectfully submitted,

Laucks Testing Laboratories, Inc.

J.M. Owens

JMO:veg



This report is submitted for the exclusive use of the person, partnership, or corporation to whom it is addressed. Subsequent use of the name of this company by any member of its staff in connection with the advertising or sale of any product or process will be granted only on contract. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.

VOLATILE ORGANIC ANALYSIS  
DATA SUMMARY  
(EPA METHOD 8010 & 8020)

Client: Science Applications Date Collected: 12-11-84  
 Sample I.D.: 85-5175 GA-12 Date Received by Lab: 12-28-84  
 Sample Matrix: Sediment Date Analyzed: 1-8-85

<u>µg/Kg</u>		<u>µg/Kg</u>	
<u>1.5</u>	Benzene	<u>54.9</u>	Toluene
<u>&lt; 0.1</u>	Bromodichloromethane	<u>3.2</u>	1,1,1-Trichloroethane
<u>&lt; 0.7</u>	Bromoform	<u>&lt; 0.1</u>	1,1,2-Trichloroethane
<u>&lt; 0.1</u>	Bromomethane	<u>2.9</u>	Trichloroethene
<u>&lt; 0.1</u>	Carbon Tetrachloride	<u>ND</u>	Trichlorofluoromethane
<u>≤ 0.8</u>	Chlorobenzene	<u>&lt; 0.2</u>	Vinyl Chloride
<u>&lt; 0.8</u>	Chloroethane		
<u>&lt; 0.2</u>	2-Chloroethylvinylether		
<u>&lt; 0.1</u>	Chloroform		
<u>&lt; 0.2</u>	Chloromethane		
<u>&lt; 0.1</u>	Dibromochloromethane		
<u>13.0</u>	1,2-Dichlorobenzene		
<u>&lt; 0.4</u>	1,3-Dichlorobenzene		
<u>&lt; 0.6</u>	1,4-Dichlorobenzene		
<u>ND</u>	Dichlorodifluoromethane		
<u>3.6</u>	1,1-Dichloroethane		
<u>&lt; 0.1</u>	1,2-Dichloroethane		
<u>&lt; 0.1</u>	1,1-Dichloroethene		
<u>&lt; 0.1</u>	trans-1,2-Dichloroethene		
<u>&lt; 0.1</u>	1,2-Dichloropropane		
<u>&lt; 0.1</u>	cis-1,3-Dichloropropene		
<u>&lt; 0.1</u>	trans-1,3-Dichloropropene		
<u>&lt; 0.1</u>	Ethyl Benzene		
<u>&lt; 0.5</u>	Methylene Chloride		
<u>&lt; 0.4</u>	1,1,2,2-Tetrachloroethane		
<u>4.5</u>	Tetrachloroethene		

ND = Not Detected, limit of detection for this compound has not been fully evaluated.

VOLATILE ORGANIC ANALYSIS  
ATA SUMMARY  
(EPA METHOD 8010 & 8020)

Client: Science Applications Date Collected: 12-11-84  
 Sample I.D.: 85-5176 S.D. Date Received by Lab: 12-28-84  
 Sample Matrix: Sediment Date Analyzed: 1-8-85

<u>ug/Yg</u>		<u>ug/Yg</u>	
40.7	Benzene	658	Toluene
< 0.1	Bromodichloromethane	12.0	1,1,1-Trichloroethane
< 0.7	Bromoform	< 0.1	1,1,2-Trichloroethane
< 0.1	Bromomethane	65.5	Trichloroethene
< 0.1	Carbon Tetrachloride	ND	Trichlorofluoromethane
1.8	Chlorobenzene	< 0.2	Vinyl Chloride
< 0.8	Chloroethane		
< 0.2	2-Chloroethylvinylether		
< 0.1	Chloroform		
< 0.2	Chloromethane		
< 0.1	Dibromochloromethane		
273	1,2-Dichlorobenzene		
34.3	1,3-Dichlorobenzene		
< 0.6	1,4-Dichlorobenzene		
ND	Dichlorodifluoromethane		
202	1,1-Dichloroethane		
1.1	1,2-Dichloroethane		
8.2	1,1-Dichloroethene		
229	trans-1,2-Dichloroethene		
0.6	1,2-Dichloropropane		
< 0.1	cis-1,3-Dichloropropene		
< 0.1	trans-1,3-Dichloropropene		
< 0.1	Ethyl Benzene		
45.9	Methylene Chloride		
< 0.4	1,1,2,2-Tetrachloroethane		
105	Tetrachloroethene		

ND = Not Detected, limit of detection for this compound has not been fully evaluated.

## VOLATILE ORGANIC ANALYSIS

## DATA SUMMARY

(EPA METHOD 8010 &amp; 8020)

Client: Science Applications Date Collected: 12-11-84  
 Sample I.D.: 85-5177 SD-1 Date Received by Lab: 12-28-84  
 Sample Matrix: Sediment Date Analyzed: 1-6-85

<u>ug/Kg</u>		<u>ug/Kg</u>	
< 0.2	Benzene	< 0.4	Toluene
< 0.1	Bromodichloromethane	2.9	1,1,1-Trichloroethane
< 0.7	Bromoform	< 0.1	1,1,2-Trichloroethane
< 0.1	Bromomethane	2.4	Trichloroethene
< 0.1	Carbon Tetrachloride	ND	Trichlorofluoromethane
< 0.8	Chlorobenzene	< 0.2	Vinyl Chloride
< 0.8	Chloroethane		
< 0.2	2-Chloroethylvinylether		
< 0.1	Chloroform		
< 0.2	Chloromethane		
< 0.1	Dibromochloromethane		
1.2	1,2-Dichlorobenzene		
< 0.4	1,3-Dichlorobenzene		
0.6	1,4-Dichlorobenzene		
ND	Dichlorodifluoromethane		
< 0.1	1,1-Dichloroethane		
< 0.1	1,2-Dichloroethane		
< 0.1	1,1-Dichloroethene		
< 0.1	trans-1,2-Dichloroethene		
< 0.1	1,2-Dichloropropane		
< 0.1	cis-1,3-Dichloropropene		
< 0.1	trans-1,3-Dichloropropene		
< 0.1	Ethyl Benzene		
< 0.5	Methylene Chloride		
< 0.4	1,1,2,2-Tetrachloroethane		
4.5	Tetrachloroethene		

ND = Not Detected, limit of detection for this compound has not been fully evaluated.

## VOLATILE ORGANIC ANALYSIS

## DATA SUMMARY

(EPA METHOD 8010 &amp; 8020)

Client: Science Applications Date Collected: 12-11-84  
 Sample I.D.: 85-5387 Date Received by Lab: 12-28-84  
 Sample Matrix: Sediment Date Analyzed: 1-8-85

<u>µg/Kg</u>		<u>µg/Kg</u>	
< 0.2	Benzene	< 0.4	Toluene
< 0.1	Bromodichloromethane	2.4	1,1,1-Trichloroethane
< 0.7	Bromoform	< 0.1	1,1,2-Trichloroethane
< 0.1	Bromomethane	1.9	Trichloroethene
< 0.1	Carbon Tetrachloride	ND	Trichlorofluoromethane
< 0.8	Chlorobenzene	< 0.2	Vinyl Chloride
< 0.8	Chloroethane		
< 0.2	2-Chloroethylvinylether		
< 0.1	Chloroform		
< 0.2	Chloromethane		
< 0.1	Dibromochloromethane		
< 0.4	1,2-Dichlorobenzene		
< 0.4	1,3-Dichlorobenzene		
< 0.6	1,4-Dichlorobenzene		
ND	Dichlorodifluoromethane		
< 0.1	1,1-Dichloroethane		
< 0.1	1,2-Dichloroethane		
< 0.1	1,1-Dichloroethene		
< 0.1	trans-1,2-Dichloroethene		
< 0.1	1,2-Dichloropropane		
< 0.1	cis-1,3-Dichloropropene		
< 0.1	trans-1,3-Dichloropropene		
< 0.1	Ethyl Benzene		
< 0.5	Methylene Chloride		
< 0.4	1,1,2,2-Tetrachloroethane		
18.9	Tetrachloroethene		

ND = Not Detected, limit of detection for this compound has not been fully evaluated.



VOLATILE ORGANIC ANALYSIS  
DATA SUMMARY  
(EPA METHOD 8010 & 8020)

Client: Science Applications Date Collected: 12-11-84  
 Sample I.D.: 85-5388 SL 14 Date Received by Lab: 12-28-84  
 Sample Matrix: Sediment Date Analyzed: 1-8-85

<u>µg/Kg</u>		<u>µg/Kg</u>	
< 0.2	Benzene	< 0.4	Toluene
< 0.1	Bromodichloromethane	2.3	1,1,1-Trichloroethane
< 0.7	Bromoform	< 0.1	1,1,2 Trichloroethane
< 0.1	Bromomethane	1.3	Trichloroethene
< 0.1	Carbon Tetrachloride	ND	Trichlorofluoromethane
< 0.8	Chlorobenzene	< 0.2	Vinyl Chloride
< 0.8	Chloroethane		
< 0.2	2-Chloroethylvinylether		
< 0.1	Chloroform		
< 0.2	Chloromethane		
< 0.1	Dibromochloromethane		
< 0.4	1,2-Dichlorobenzene		
< 0.4	1,3-Dichlorobenzene		
< 0.6	1,4-Dichlorobenzene		
ND	Dichlorodifluoromethane		
< 0.1	1,1-Dichloroethane		
< 0.1	1,2-Dichloroethane		
< 0.1	1,1-Dichloroethene		
< 0.1	trans-1,2-Dichloroethene		
< 0.1	1,2-Dichloropropane		
< 0.1	cis-1,3-Dichloropropene		
< 0.1	trans-1,3-Dichloropropene		
< 0.1	Ethyl Benzene		
< 0.5	Methylene Chloride		
< 0.4	1,1,2,2-Tetrachloroethane		
0.6	Tetrachloroethene		

ND = Not Detected, limit of detection for this compound has not been fully evaluated.

VOLATILE ORGANIC ANALYSIS  
DATA SUMMARY  
(EPA METHOD 8010 & 8020)

Client: Science Applications Date Collected: 12-11-84  
 Sample I.D.: 85-5389 Date Received by Lab: 12-28-84  
 Sample Matrix: Sediment Date Analyzed: 1-8-85

<u>ug/kg</u>		<u>ug/kg</u>	
< 0.2	Benzene	< 0.4	Toluene
< 0.1	Bromodichloromethane	3.7	1,1,1-Trichloroethane
< 0.7	Bromoform	< 0.1	1,1,2-Trichloroethane
< 0.1	Bromomethane	2.3	Trichloroethene
< 0.1	Carbon Tetrachloride	ND	Trichlorofluoromethane
< 0.8	Chlorobenzene	< 0.2	Vinyl Chloride
< 0.8	Chloroethane		
< 0.2	2-Chloroethylvinylether		
< 0.1	Chloroform		
< 0.2	Chloromethane		
< 0.1	Dibromochloromethane		
< 0.4	1,2-Dichlorobenzene		
< 0.4	1,3-Dichlorobenzene		
< 0.6	1,4-Dichlorobenzene		
ND	Dichlorodifluoromethane		
< 0.1	1,1-Dichloroethane		
< 0.1	1,2-Dichloroethane		
< 0.1	1,1-Dichloroethene		
< 0.1	trans-1,2-Dichloroethene		
< 0.1	1,2-Dichloropropane		
< 0.1	cis-1,3-Dichloropropene		
< 0.1	trans-1,3-Dichloropropene		
< 0.1	Ethyl Benzene		
< 0.5	Methylene Chloride		
< 0.4	1,1,2,2-Tetrachloroethane		
5.2	Tetrachloroethene		

ND = Not Detected, limit of detection for this compound has not been fully evaluated.

VOLATILE ORGANIC ANALYSIS  
DATA SUMMARY  
(EPA METHOD 8010 & 8020)

Client: Science Applications Date Collected: 12-11-84  
 Sample I.D.: 85-5390 SL-14 Date Received by Lab: 12-28-84  
 Sample Matrix: Sediment Date Analyzed: 1-8-85

<u>µg/Kg</u>		<u>µg/Kg</u>	
<u>&lt; 0.2</u>	Benzene	<u>&lt; 0.4</u>	Toluene
<u>&lt; 0.1</u>	Bromodichloromethane	<u>0.9</u>	1,1,1-Trichloroethane
<u>&lt; 0.7</u>	Bromoform	<u>&lt; 0.1</u>	1,1,2-Trichloroethane
<u>&lt; 0.1</u>	Bromomethane	<u>1.5</u>	Trichloroethene
<u>&lt; 0.1</u>	Carbon Tetrachloride	<u>ND</u>	Trichlorofluoromethane
<u>&lt; 0.8</u>	Chlorobenzene	<u>&lt; 0.2</u>	Vinyl Chloride
<u>&lt; 0.8</u>	Chloroethane		
<u>&lt; 0.2</u>	2-Chloroethylvinylether		
<u>&lt; 0.1</u>	Chloroform		
<u>&lt; 0.2</u>	Chloromethane		
<u>&lt; 0.1</u>	Dibromochloromethane		
<u>&lt; 0.4</u>	1,2-Dichlorobenzene		
<u>&lt; 0.4</u>	1,3-Dichlorobenzene		
<u>&lt; 0.6</u>	1,4-Dichlorobenzene		
<u>ND</u>	Dichlorodifluoromethane		
<u>&lt; 0.1</u>	1,1-Dichloroethane		
<u>&lt; 0.1</u>	1,2-Dichloroethane		
<u>&lt; 0.1</u>	1,1-Dichloroethene		
<u>&lt; 0.1</u>	trans-1,2-Dichloroethene		
<u>&lt; 0.1</u>	1,2-Dichloropropane		
<u>&lt; 0.1</u>	cis-1,3-Dichloropropene		
<u>&lt; 0.1</u>	trans-1,3-Dichloropropene		
<u>&lt; 0.1</u>	Ethyl Benzene		
<u>102</u>	Methylene Chloride		
<u>&lt; 0.4</u>	1,1,2,2-Tetrachloroethane		
<u>2.0</u>	Tetrachloroethene		

ND = Not Detected, limit of detection for this compound has not been fully evaluated.



Analytical **Technologies, Inc.**

Corporate Headquarters: 1000 West Street, Suite 200, La Jolla, CA 92038

I.D. 01-001815

January 31, 1985

Science Applications International Corp.  
476 Prospect Street  
La Jolla, CA 92038

Attention: Dana Enrett/Donna Mickelson

Purchase Order No.: 11-850453-38

On December 28, 1984 Analytical Technologies, Inc. received seven (7) sewer discharge samples, six (6) water samples, and eleven (11) sediment samples for analysis of volatile organic acids (VOA), cyanides (CN), chemical oxygen demand (COD), and phenol.

Analysis of VOA was performed by gas chromatography with Hall detector and photoionization detector, in accordance with EPA method 601,602 for the water samples and 8010, 8020 for the soil samples. Samples 85-5171, 85-5172, 85-5173, and 85-5174 were mostly liquid samples, and were analyzed in accordance with EPA methods 601 and 602. Analysis of phenol for five (5) of the sewer discharge samples was performed by a direct photometric method, in accordance with Standard Methods for the Examination of Water and Waste water 510c. Analysis of COD for the seven (7) sewer discharge samples was performed by wet method in accordance with EPA method 410 and the analysis of CN for two (2) of the sewer discharge sample was performed by wet methods in accordance with EPA method 335.1.

Attached are the analytical results.

*John W. Strand*

John W. Strand  
Support Services Manager

Reviewed by

*Mark King*  
Mark King  
Laboratory Manager

Format

Attachments

NOTE: Samples from this project will be disposed of in thirty (30) days from the date of this report, unless we are informed otherwise.



# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

117 N. FIRST  
ANN ARBOR, MICHIGAN 48104 (313) 662-3104

Project: A2776  
Report Date: 03-02-85

Client P.O.  
Report: 12453

Samples Recvd: 02-25-85  
Refer Questions To:  
THOMAS CULLEN

Client:  
JRB ASSOCIATES, INC.  
8400 WESTPARK DRIVE  
MC LEAN, VA 22102  
Attention: RICH EADES

Approved: *Thomas Cullen*

\*\*\*  
Residual Samples Will Be Held  
TWO WEEKS  
\*\*\*

Client I.D.: MW 010  
ERG Sample No.: 02/125537  
Matrix: GROUND WATER  
Date Sampled: 02-21-85

Parameter	Result	Units
PURGEABLE AROMATICS		
BENZENE	9.1	ug/L
1,2-DICHLOROBENZENE	ND (0.15)	ug/L
1,3-DICHLOROBENZENE	ND (0.32)	ug/L
1,4-DICHLOROBENZENE	ND (0.24)	ug/L
ETHYLBENZENE	ND (0.3)	ug/L
TOLUENE	1.7	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	ND (0.2)	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	ND (0.25)	ug/L
TRICHLOROFLUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	ND (0.05)	ug/L
DICHLOROETHANE, 1,1-	ND (0.05)	ug/L
TRANS-1,2-DICHLOROETHYLENE	1.2	ug/L
CHLOROFORM	ND (0.05)	ug/L
DICHLOROETHANE, 1,2-	ND (0.05)	ug/L
TRICHLOROETHANE, 1,1,1-	ND (0.05)	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	ND (0.04)	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	ND (0.05)	ug/L
DIBROMOCHLOROMETHANE	ND (0.09)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.03)	ug/L
TETRACHLOROETHYLENE	ND (0.05)	ug/L



# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

Project: A2776  
Report Date: 03-02-85

Client I.D.: MW 010  
ERG Sample No.: 02/125537  
Matrix: GROUND WATER  
Date Sampled: 02-21-85

Parameter	Result	Units
CHLORO BENZENE	ND (0.25)	ug/L
DICHLORO BENZENE, 1,3-	ND (0.32)	ug/L
DICHLORO BENZENE, 1,2-	ND (0.15)	ug/L
DICHLORO BENZENE, 1,4-	ND (0.24)	ug/L

Client I.D.: MW 011  
ERG Sample No.: 02/125538  
Matrix: GROUND WATER  
Date Sampled: 02-21-85

Parameter	Result	Units
PURGEABLE AROMATICS		
BENZENE	83	ug/L
1,2-DICHLORO BENZENE	ND (0.15)	ug/L
1,3-DICHLORO BENZENE	ND (0.32)	ug/L
1,4-DICHLORO BENZENE	ND (0.24)	ug/L
ETHYL BENZENE	11	ug/L
TOLUENE	8.8	ug/L
CHLORO BENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	6	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	ND (0.25)	ug/L
TRICHLOROFLUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	0.67	ug/L
DICHLOROETHANE, 1,1-	ND (0.05)	ug/L
TRANS-1,2-DICHLOROETHYLENE	700	ug/L
CHLOROFORM	ND (0.05)	ug/L
DICHLOROETHANE, 1,2-	39	ug/L
TRICHLOROETHANE, 1,1,1-	ND (0.05)	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	ND (0.04)	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	2100	ug/L
DIBROMOCHLOROMETHANE	ND (0.04)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.03)	ug/L
TETRACHLOROETHYLENE	2700	ug/L
CHLORO BENZENE	ND (0.25)	ug/L



# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

Project: A2776  
Report Date: 03-02-85

Client I.D.: MW 011  
ERG Sample No.: 02/125538  
Matrix: GROUND WATER  
Date Sampled: 02-21-85

Parameter	Result	Units
DICHLOROBENZENE, 1,3-	ND (0.32)	ug/L
DICHLOROBENZENE, 1,2-	ND (0.15)	ug/L
DICHLOROBENZENE, 1,4-	ND (0.24)	ug/L

Client I.D.: MW 012  
ERG Sample No.: 02/125539  
Matrix: GROUND WATER  
Date Sampled: 02-21-85

Parameter	Result	Units
PURGEABLE AROMATICS		
BENZENE	12	ug/L
1,2-DICHLOROBENZENE	ND (0.15)	ug/L
1,3-DICHLOROBENZENE	ND (0.32)	ug/L
1,4-DICHLOROBENZENE	ND (0.24)	ug/L
ETHYLBENZENE	ND (0.3)	ug/L
TOLUENE	3.1	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	9	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	ND (0.25)	ug/L
TRICHLOROFLUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	ND (0.05)	ug/L
DICHLOROETHANE, 1,1-	ND (0.05)	ug/L
TRANS-1,2-DICHLOROETHYLENE	220	ug/L
CHLOROFORM	ND (0.05)	ug/L
DICHLOROETHANE, 1,2-	62	ug/L
TRICHLOROETHANE, 1,1,1-	ND (0.05)	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	ND (0.04)	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	18	ug/L
DIBROMOCHLOROMETHANE	ND (0.09)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.03)	ug/L
TETRACHLOROETHYLENE	6.3	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
DICHLOROBENZENE, 1,3-	ND (0.32)	ug/L



# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

Project: A2776  
Report Date: 03-02-85

Client I.D.: MW 012  
ERG Sample No.: 02/125539  
Matrix: GROUND WATER  
Date Sampled: 02-21-85

Parameter	Result	Units
DICHLOROBENZENE, 1,2-	ND (0.15)	ug/L
DICHLOROBENZENE, 1,4-	ND (0.24)	ug/L

Client I.D.: MW 013  
ERG Sample No.: 02/125540  
Matrix: ELUTRIATE  
Date Sampled: 02-21-85

Parameter	Result	Units
PURGEABLE AROMATICS		
BENZENE	24	ug/L
1,2-DICHLOROBENZENE	ND (0.15)	ug/L
1,3-DICHLOROBENZENE	ND (0.32)	ug/L
1,4-DICHLOROBENZENE	ND (0.24)	ug/L
ETHYLBENZENE	360	ug/L
TOLUENE	24	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	ND (0.2)	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	ND (0.25)	ug/L
TRICHLOROFLUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	ND (0.05)	ug/L
DICHLOROETHANE, 1,1-	ND (0.05)	ug/L
TRANS-1,2-DICHLOROETHYLENE	620	ug/L
CHLOROFORM	ND (0.05)	ug/L
DICHLOROETHANE, 1,2-	ND (0.05)	ug/L
TRICHLOROETHANE, 1,1,1-	ND (0.05)	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	ND (0.04)	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	2.8	ug/L
DIBROMOCHLOROMETHANE	ND (0.09)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.03)	ug/L
TETRACHLOROETHYLENE	15	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
DICHLOROBENZENE, 1,3-	ND (0.32)	ug/L
DICHLOROBENZENE, 1,2-	ND (0.15)	ug/L





# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

Project: A2776  
Report Date: 03-02-85

Client I.D.: MW 013  
ERG Sample No.: 02/125540  
Matrix: ELUTRIATE  
Date Sampled: 02-21-85

Parameter	Result	Units
DICHLOROBENZENE, 1,4-	ND (0.24)	ug/L

Client I.D.: MW 021  
ERG Sample No.: 02/125541  
Matrix: GROUND WATER  
Date Sampled: 02-21-85

Parameter	Result	Units
PURGEABLE AROMATICS	ND (0.3)	ug/L
BENZENE	ND (0.15)	ug/L
1,2-DICHLOROBENZENE	ND (0.32)	ug/L
1,3-DICHLOROBENZENE		
1,4-DICHLOROBENZENE	ND (0.24)	ug/L
ETHYLBENZENE	1.4	ug/L
TOLUENE	ND (0.3)	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	ND (0.2)	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	ND (0.25)	ug/L
TRICHLOROFLUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	ND (0.05)	ug/L
DICHLOROETHANE, 1,1-	ND (0.05)	ug/L
TRANS-1,2-DICHLOROETHYLENE	5.8	ug/L
CHLOROFORM	ND (0.05)	ug/L
DICHLOROETHANE, 1,2-	ND (0.05)	ug/L
TRICHLOROETHANE, 1,1,1-	ND (0.05)	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	ND (0.04)	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	1.7	ug/L
DIBROMOCHLOROMETHANE	ND (0.09)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.03)	ug/L
TETRACHLOROETHYLENE	1.8	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
DICHLOROBENZENE, 1,3-	ND (0.32)	ug/L
DICHLOROBENZENE, 1,2-	ND (0.15)	ug/L
DICHLOROBENZENE, 1,4-	ND (0.24)	ug/L



# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

Project: A2776  
Report Date: 03-02-85

Client I.D.: MW 022  
ERG Sample No.: 02/125542  
Matrix: GROUND WATER  
Date Sampled: 02-21-85

Parameter	Result	Units
PURGEABLE AROMATICS		
BENZENE	ND (0.3)	ug/L
1,2-DICHLOROBENZENE	ND (0.15)	ug/L
1,3-DICHLOROBENZENE	ND (0.32)	ug/L
1,4-DICHLOROBENZENE	ND (0.24)	ug/L
ETHYLBENZENE	2.1	ug/L
TOLUENE	ND (0.3)	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	ND (0.2)	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	ND (0.25)	ug/L
TRICHLOROFLUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	ND (0.05)	ug/L
DICHLOROETHANE, 1,1-	ND (0.05)	ug/L
TRANS-1,2-DICHLOROETHYLENE	0.1	ug/L
CHLOROFORM	ND (0.05)	ug/L
DICHLOROETHANE, 1,2-	ND (0.05)	ug/L
TRICHLOROETHANE, 1,1,1-	ND (0.05)	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	ND (0.04)	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	0.48	ug/L
DIBROMOCHLOROMETHANE	ND (0.09)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.03)	ug/L
TETRACHLOROETHYLENE	1.4	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
DICHLOROBENZENE, 1,3-	ND (0.32)	ug/L
DICHLOROBENZENE, 1,2-	ND (0.15)	ug/L
DICHLOROBENZENE, 1,4-	ND (0.24)	ug/L



# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

Project: A2776  
Report Date: 03-02-85

Client I.D.: MW 023  
ERG Sample No.: 02/125543  
Matrix: GROUND WATER  
Date Sampled: 02-21-85

Parameter	Result	Units
PURGEABLE AROMATICS		
BENZENE	ND (0.3)	ug/L
1,2-DICHLOROBENZENE	ND (0.15)	ug/L
1,3-DICHLOROBENZENE	ND (0.32)	ug/L
1,4-DICHLOROBENZENE	ND (0.24)	ug/L
ETHYLBENZENE	ND (0.3)	ug/L
TOLUENE	ND (0.3)	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	ND (0.2)	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	ND (0.25)	ug/L
TRICHLOROFLUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	ND (0.05)	ug/L
DICHLOROETHANE, 1,1-	ND (0.05)	ug/L
TRANS-1,2-DICHLOROETHYLENE	ND (0.05)	ug/L
CHLOROFORM	ND (0.05)	ug/L
DICHLORETHANE, 1,2-	ND (0.05)	ug/L
TRICHLOROETHANE, 1,1,1-	ND (0.05)	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	ND (0.04)	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	0.68	ug/L
DIBROMOCHLOROMETHANE	ND (0.09)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.03)	ug/L
TETRACHLOROETHYLENE	1.1	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
DICHLOROBENZENE, 1,3-	ND (0.32)	ug/L
DICHLOROBENZENE, 1,2-	ND (0.15)	ug/L
DICHLOROBENZENE, 1,4-	ND (0.24)	ug/L



# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

Project: A2776  
Report Date: 03-02-85

Client I.D.: MW 024  
ERG Sample No.: 02/125544  
Matrix: GROUND WATER  
Date Sampled: 02-21-85

Parameter	Result	Units
PURGEABLE AROMATICS		
BENZENE	ND (0.3)	ug/L
1,2-DICHLOROBENZENE	ND (0.15)	ug/L
1,3-DICHLOROBENZENE	ND (0.32)	ug/L
1,4-DICHLOROBENZENE	ND (0.24)	ug/L
ETHYLBENZENE	0.72	ug/L
TOLUENE	0.29	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	ND (0.2)	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	ND (0.25)	ug/L
TRICHLOROFLUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	ND (0.05)	ug/L
DICHLOROETHANE, 1,1-	ND (0.05)	ug/L
TRANS-1,2-DICHLOROETHYLENE	0.1	ug/L
CHLOROFORM	ND (0.05)	ug/L
DICHLOROETHANE, 1,2-	ND (0.05)	ug/L
TRICHLOROETHANE, 1,1,1-	ND (0.05)	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	ND (0.04)	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	0.23	ug/L
DIBROMOCHLOROMETHANE	ND (0.09)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.03)	ug/L
TETRACHLOROETHYLENE	0.50	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
DICHLOROBENZENE, 1,3-	ND (0.32)	ug/L
DICHLOROBENZENE, 1,2-	ND (0.15)	ug/L
DICHLOROBENZENE, 1,4-	ND (0.24)	ug/L



# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

Project: A2776  
Report Date: 03-02-85

Client I.D.: MW 025  
ERG Sample No.: 02/125545  
Matrix: GROUND WATER  
Date Sampled: 02-21-85

Parameter	Result	Units
PURGEABLE AROMATICS		
BENZENE	5.5	ug/L
1,2-DICHLOROBENZENE	ND (0.15)	ug/L
1,3-DICHLOROBENZENE	ND (0.32)	ug/L
1,4-DICHLOROBENZENE	ND (0.24)	ug/L
ETHYLBENZENE	4.0	ug/L
TOLUENE	ND (0.3)	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	ND (0.2)	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	ND (0.25)	ug/L
TRICHLOROFLUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	ND (0.05)	ug/L
DICHLOROETHANE, 1,1-	ND (0.05)	ug/L
TRANS-1,2-DICHLOROETHYLENE	60	ug/L
CHLOROFORM	ND (0.05)	ug/L
DICHLOROETHANE, 1,2-	ND (0.05)	ug/L
TRICHLOROETHANE, 1,1,1-	ND (0.05)	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	ND (0.04)	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	55	ug/L
DIBROMOCHLOROMETHANE	ND (0.09)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.03)	ug/L
TETRACHLOROETHYLENE	1400	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
DICHLOROBENZENE, 1,3-	ND (0.32)	ug/L
DICHLOROBENZENE, 1,2-	ND (0.15)	ug/L
DICHLOROBENZENE, 1,4-	ND (0.24)	ug/L



# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

Project: A2776  
Report Date: 03-02-85

Client I.D.: MW 027  
ERG Sample No.: 02/125546  
Matrix: GROUND WATER  
Date Sampled: 02-21-85

Parameter	Result	Units
PURGEABLE AROMATICS		
BENZENE	ND (0.3)	ug/L
1,2-DICHLOROBENZENE	ND (0.15)	ug/L
1,3-DICHLOROBENZENE	ND (0.32)	ug/L
1,4-DICHLOROBENZENE	ND (0.24)	ug/L
ETHYLBENZENE	0.34	ug/L
TOLUENE	0.27	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	10	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	ND (0.25)	ug/L
TRICHLOROFLUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	1.5	ug/L
DICHLOROETHANE, 1,1-	ND (0.05)	ug/L
TRANS-1,2-DICHLOROETHYLENE	790	ug/L
CHLOROFORM	ND (0.05)	ug/L
DICHLOROETHANE, 1,2-	ND (0.05)	ug/L
TRICHLOROETHANE, 1,1,1-	ND (0.05)	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	ND (0.04)	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	300	ug/L
DIBROMOCHLOROMETHANE	ND (0.09)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.03)	ug/L
TETRACHLOROETHYLENE	940	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
DICHLOROBENZENE, 1,3-	ND (0.32)	ug/L
DICHLOROBENZENE, 1,2-	ND (0.15)	ug/L
DICHLOROBENZENE, 1,4-	ND (0.24)	ug/L



# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

Project: A2776  
Report Date: 03-02-85

Client I.D.: GA-1  
ERG Sample No.: 02/125547  
Matrix: GROUND WATER  
Date Sampled: 02-21-85

Parameter	Result	Units
PURGEABLE AROMATICS		
BENZENE	ND (0.3)	ug/L
1,2-DICHLOROBENZENE	ND (0.15)	ug/L
1,3-DICHLOROBENZENE	ND (0.32)	ug/L
1,4-DICHLOROBENZENE	ND (0.24)	ug/L
ETHYLBENZENE	ND (0.3)	ug/L
TOLUENE	1.1	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	ND (0.2)	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	ND (0.25)	ug/L
TRICHLOROFLUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	ND (0.05)	ug/L
DICHLOROETHANE, 1,1-	ND (0.05)	ug/L
TRANS-1,2-DICHLOROETHYLENE	ND (0.05)	ug/L
CHLOROFORM	ND (0.05)	ug/L
DICHLOROETHANE, 1,2-	ND (0.05)	ug/L
TRICHLOROETHANE, 1,1,1-	ND (0.05)	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	ND (0.04)	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	0.2	ug/L
DIBROMOCHLOROMETHANE	ND (0.09)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.03)	ug/L
TETRACHLOROETHYLENE	0.68	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
DICHLOROBENZENE, 1,3-	ND (0.32)	ug/L
DICHLOROBENZENE, 1,2-	ND (0.15)	ug/L
DICHLOROBENZENE, 1,4-	ND (0.24)	ug/L



# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

Project: A2776  
Report Date: 03-02-85

Client I.D.: QA-2  
ERG Sample No.: 02/125548  
Matrix: GROUND WATER  
Date Sampled: 02-21-85

Parameter	Result	Units
PURGEABLE AROMATICS		
BENZENE	ND (0.3)	ug/L
1,2-DICHLOROBENZENE	ND (0.15)	ug/L
1,3-DICHLOROBENZENE	ND (0.32)	ug/L
1,4-DICHLOROBENZENE	ND (0.24)	ug/L
ETHYLBENZENE	ND (0.3)	ug/L
TOLUENE	0.54	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	ND (0.2)	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	ND (0.25)	ug/L
TRICHLOROFLUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	ND (0.05)	ug/L
DICHLOROETHANE, 1,1-	ND (0.05)	ug/L
TRANS-1,2-DICHLOROETHYLENE	ND (0.05)	ug/L
CHLOROFORM	ND (0.05)	ug/L
DICHLOROETHANE, 1,2-	ND (0.05)	ug/L
TRICHLOROETHANE, 1,1,1-	ND (0.05)	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	ND (0.04)	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	0.18	ug/L
DIBROMOCHLOROMETHANE	ND (0.09)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.03)	ug/L
TETRACHLOROETHYLENE	0.48	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
DICHLOROBENZENE, 1,3-	ND (0.32)	ug/L
DICHLOROBENZENE, 1,2-	ND (0.15)	ug/L
DICHLOROBENZENE, 1,4-	ND (0.24)	ug/L





# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

Project: A2776  
Report Date: 03-02-85

Client I.D.: QA-3  
ERG Sample No.: 02/125549  
Matrix: GROUND WATER  
Date Sampled: 02-21-85

Parameter	Result	Units
PURGEABLE AROMATICS		
BENZENE	23	ug/L
1,2-DICHLOROBENZENE	ND (0.15)	ug/L
1,3-DICHLOROBENZENE	ND (0.32)	ug/L
1,4-DICHLOROBENZENE	ND (0.24)	ug/L
ETHYLBENZENE	570	ug/L
TOLUENE	56	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	ND (0.2)	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	ND (0.25)	ug/L
TRICHLOROFLUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	ND (0.05)	ug/L
DICHLOROETHANE, 1,1-	ND (0.05)	ug/L
TRANS-1,2-DICHLOROETHYLENE	640	ug/L
CHLOROFORM	ND (0.05)	ug/L
DICHLOROETHANE, 1,2-	ND (0.05)	ug/L
TRICHLOROETHANE, 1,1,1-	ND (0.05)	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	ND (0.04)	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	0.53	ug/L
DIBROMOCHLOROMETHANE	ND (0.09)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.03)	ug/L
TETRACHLOROETHYLENE	30	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
DICHLOROBENZENE, 1,3-	ND (0.32)	ug/L
DICHLOROBENZENE, 1,2-	ND (0.15)	ug/L
DICHLOROBENZENE, 1,4-	ND (0.24)	ug/L



# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

Project: A2776  
Report Date: 03-02-85

Client I.D.: MW 001 J  
ERG Sample No.: 02/125599  
Matrix: GROUND WATER  
Date Sampled: 02-22-85

Parameter	Result	Units
PURGEABLE AROMATICS		
BENZENE	ND (0.3)	ug/L
1,2-DICHLOROBENZENE	ND (0.15)	ug/L
1,3-DICHLOROBENZENE	ND (0.32)	ug/L
1,4-DICHLOROBENZENE	ND (0.24)	ug/L
ETHYLBENZENE	ND (0.3)	ug/L
TOLUENE	ND (0.3)	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	ND (0.2)	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	ND (0.25)	ug/L
TRICHLOROFLUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	45	ug/L
DICHLOROETHANE, 1,1-	ND (0.05)	ug/L
TRANS-1,2-DICHLOROETHYLENE	20	ug/L
CHLOROFORM	ND (0.05)	ug/L
DICHLORETHANE, 1,2-	0.58	ug/L
TRICHLOROETHANE, 1,1,1-	ND (0.05)	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	ND (0.04)	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	170	ug/L
DIBROMOCHLOROMETHANE	ND (0.09)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.03)	ug/L
TETRACHLOROETHYLENE	1500	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
DICHLOROBENZENE, 1,3-	ND (0.32)	ug/L
DICHLOROBENZENE, 1,2-	ND (0.15)	ug/L
DICHLOROBENZENE, 1,4-	ND (0.24)	ug/L



# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

Project: A2776  
Report Date: 03-02-85

Client I.D.: MW 002 J  
ERG Sample No.: 02/125600  
Matrix: GROUND WATER  
Date Sampled: 02-22-85

Parameter	Result	Units
PURGEABLE AROMATICS		
BENZENE	ND (0.3)	ug/L
1,2-DICHLOROBENZENE	ND (0.15)	ug/L
1,3-DICHLOROBENZENE	ND (0.32)	ug/L
1,4-DICHLOROBENZENE	ND (0.24)	ug/L
ETHYLBENZENE	0.4	ug/L
TOLUENE	ND (0.3)	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	ND (0.2)	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	ND (0.25)	ug/L
TRICHLOROFLUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	ND (0.05)	ug/L
DICHLOROETHANE, 1,1-	ND (0.05)	ug/L
TRANS-1,2-DICHLOROETHYLENE	ND (0.05)	ug/L
CHLOROFORM	ND (0.05)	ug/L
DICHLOROETHANE, 1,2-	ND (0.05)	ug/L
TRICHLOROETHANE, 1,1,1-	ND (0.05)	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	ND (0.04)	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	0.21	ug/L
DIBROMOCHLOROMETHANE	ND (0.09)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.03)	ug/L
TETRACHLOROETHYLENE	1.0	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
DICHLOROBENZENE, 1,3-	ND (0.32)	ug/L
DICHLOROBENZENE, 1,2-	ND (0.15)	ug/L
DICHLOROBENZENE, 1,4-	ND (0.24)	ug/L



# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

Project: A2776  
Report Date: 03-02-85

Client I.D.: MW 004 J  
ERG Sample No.: 02/125601  
Matrix: GROUND WATER  
Date Sampled: 02-22-85

Parameter	Result	Units
PURGEABLE AROMATICS		
BENZENE	ND (0.3)	ug/L
1,2-DICHLOROBENZENE	ND (0.15)	ug/L
1,3-DICHLOROBENZENE	ND (0.32)	ug/L
1,4-DICHLOROBENZENE	ND (0.24)	ug/L
ETHYLBENZENE	ND (0.3)	ug/L
TOLUENE	ND (0.3)	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	ND (0.2)	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	ND (0.25)	ug/L
TRICHLOROFLUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	ND (0.05)	ug/L
DICHLOROETHANE, 1,1-	ND (0.05)	ug/L
TRANS-1,2-DICHLOROETHYLENE	ND (0.05)	ug/L
CHLOROFORM	ND (0.05)	ug/L
DICHLOROETHANE, 1,2-	ND (0.05)	ug/L
TRICHLOROETHANE, 1,1,1-	ND (0.05)	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	ND (0.04)	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	0.14	ug/L
DIBROMOCHLOROMETHANE	ND (0.09)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.03)	ug/L
TETRACHLOROETHYLENE	0.49	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
DICHLOROBENZENE, 1,3-	ND (0.32)	ug/L
DICHLOROBENZENE, 1,2-	ND (0.15)	ug/L
DICHLOROBENZENE, 1,4-	ND (0.24)	ug/L



# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

Project: A2776  
Report Date: 03-02-85

Client I.D.: MW 101  
ERG Sample No.: 02/125602  
Matrix: GROUND WATER  
Date Sampled: 02-22-85

Parameter	Result	Units
PURGEABLE AROMATICS		
BENZENE	ND (0.3)	ug/L
1,2-DICHLOROBENZENE	ND (0.15)	ug/L
1,3-DICHLOROBENZENE	ND (0.32)	ug/L
1,4-DICHLOROBENZENE	ND (0.24)	ug/L
ETHYLBENZENE	1.3	ug/L
TOLUENE	220	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	ND (0.2)	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	ND (0.25)	ug/L
TRICHLOROFLUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	ND (0.05)	ug/L
DICHLOROETHANE, 1,1-	ND (0.05)	ug/L
TRANS-1,2-DICHLOROETHYLENE	1.2	ug/L
CHLOROFORM	ND (0.05)	ug/L
DICHLOROETHANE, 1,2-	ND (0.05)	ug/L
TRICHLOROETHANE, 1,1,1-	0.51	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	ND (0.04)	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	20	ug/L
DIBROMOCHLOROMETHANE	ND (0.09)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.03)	ug/L
TETRACHLOROETHYLENE	1.4	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
DICHLOROBENZENE, 1,3-	ND (0.32)	ug/L
DICHLOROBENZENE, 1,2-	ND (0.15)	ug/L
DICHLOROBENZENE, 1,4-	ND (0.24)	ug/L



# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

Project: A2776  
Report Date: 03-02-85

Client I.D.: MW 102  
ERG Sample No.: 02/125603  
Matrix: GROUND WATER  
Date Sampled: 02-22-85

Parameter	Result	Units
PURGEABLE AROMATICS		
BENZENE	8.0	ug/L
1,2-DICHLOROBENZENE	ND (0.15)	ug/L
1,3-DICHLOROBENZENE	ND (0.32)	ug/L
1,4-DICHLOROBENZENE	ND (0.24)	ug/L
ETHYLBENZENE	ND (0.3)	ug/L
TOLUENE	10	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	ND (0.2)	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	ND (0.25)	ug/L
TRICHLOROFLUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	0.74	ug/L
DICHLOROETHANE, 1,1-	48	ug/L
TRANS-1,2-DICHLOROETHYLENE	4.0	ug/L
CHLOROFORM	ND (0.05)	ug/L
DICHLOROETHANE, 1,2-	3.8	ug/L
TRICHLOROETHANE, 1,1,1-	4.7	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	ND (0.04)	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	14	ug/L
DIBROMOCHLOROMETHANE	ND (0.09)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.03)	ug/L
TETRACHLOROETHYLENE	3.5	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
DICHLOROBENZENE, 1,3-	ND (0.32)	ug/L
DICHLOROBENZENE, 1,2-	ND (0.15)	ug/L
DICHLOROBENZENE, 1,4-	ND (0.24)	ug/L



# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

Project: A2776  
Report Date: 03-02-85

Client I.D.: MW 103  
ERG Sample No.: 02/125604  
Matrix: GROUND WATER  
Date Sampled: 02-22-85

Parameter	Result	Units
PURGEABLE AROMATICS		
BENZENE	ND (0.3)	ug/L
1,2-DICHLOROBENZENE	ND (0.15)	ug/L
1,3-DICHLOROBENZENE	ND (0.32)	ug/L
1,4-DICHLOROBENZENE	ND (0.24)	ug/L
ETHYLBENZENE	97	ug/L
TOLUENE	42	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	25	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	ND (0.25)	ug/L
TRICHLOROFLUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	240	ug/L
DICHLOROETHANE, 1,1-	350	ug/L
TRANS-1,2-DICHLOROETHYLENE	3900	ug/L
CHLOROFORM	ND (0.05)	ug/L
DICHLOROETHANE, 1,2-	20	ug/L
TRICHLOROETHANE, 1,1,1-	7700	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	ND (0.04)	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	80	ug/L
DIBROMOCHLOROMETHANE	ND (0.09)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.03)	ug/L
TETRACHLOROETHYLENE	13	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
DICHLOROBENZENE, 1,3-	ND (0.32)	ug/L
DICHLOROBENZENE, 1,2-	ND (0.15)	ug/L
DICHLOROBENZENE, 1,4-	ND (0.24)	ug/L



# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

Project: A2776  
Report Date: 03-02-85

Client I.D.: SW 001  
ERG Sample No.: 02/125605  
Matrix: GROUND WATER  
Date Sampled: 02-22-85

Parameter	Result	Units
PURGEABLE AROMATICS		
BENZENE	22	ug/L
1,2-DICHLOROBENZENE	ND (0.15)	ug/L
1,3-DICHLOROBENZENE	ND (0.32)	ug/L
1,4-DICHLOROBENZENE	ND (0.24)	ug/L
ETHYLBENZENE	14	ug/L
TOLUENE	610	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	ND (0.2)	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	9000	ug/L
TRICHLOROFUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	2.0	ug/L
DICHLOROETHANE, 1,1-	23	ug/L
TRANS-1,2-DICHLOROETHYLENE	7.1	ug/L
CHLOROFORM	ND (0.05)	ug/L
DICHLORETHANE, 1,2-	0.5	ug/L
TRICHLOROETHANE, 1,1,1-	390	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	ND (0.04)	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	4.4	ug/L
DIBROMOCHLOROMETHANE	ND (0.09)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.03)	ug/L
TETRACHLOROETHYLENE	6.1	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
DICHLOROBENZENE, 1,3-	ND (0.32)	ug/L
DICHLOROBENZENE, 1,2-	ND (0.15)	ug/L
DICHLOROBENZENE, 1,4-	ND (0.24)	ug/L





# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

Project: A2776  
Report Date: 03-02-85

Client I.D.: SW 002  
ERG Sample No.: 02/125606  
Matrix: GROUND WATER  
Date Sampled: 02-22-85

Parameter	Result	Units
PURGEABLE AROMATICS		
BENZENE	70	ug/L
1,2-DICHLOROBENZENE	ND (0.15)	ug/L
1,3-DICHLOROBENZENE	ND (0.32)	ug/L
1,4-DICHLOROBENZENE	ND (0.24)	ug/L
ETHYLBENZENE	36	ug/L
TOLUENE	480	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	ND (0.2)	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	ND (0.25)	ug/L
TRICHLOROFLUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	3.2	ug/L
DICHLOROETHANE, 1,1-	100	ug/L
TRANS-1,2-DICHLOROETHYLENE	48	ug/L
CHLOROFORM	ND (0.05)	ug/L
DICHLOROETHANE, 1,2-	2.0	ug/L
TRICHLOROETHANE, 1,1,1-	900	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	ND (0.04)	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	10	ug/L
DIBROMOCHLOROMETHANE	ND (0.09)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.03)	ug/L
TETRACHLOROETHYLENE	100	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
DICHLOROBENZENE, 1,3-	ND (0.32)	ug/L
DICHLOROBENZENE, 1,2-	ND (0.15)	ug/L
DICHLOROBENZENE, 1,4-	ND (0.24)	ug/L



# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

Project: A2776  
Report Date: 03-02-85

Client I.D.: GA-4  
ERG Sample No.: 02/125607  
Matrix: GROUND WATER  
Date Sampled: 02-22-85

Parameter	Result	Units
PURGEABLE AROMATICS		
BENZENE	ND (0.3)	ug/L
1,2-DICHLOROBENZENE	ND (0.15)	ug/L
1,3-DICHLOROBENZENE	ND (0.32)	ug/L
1,4-DICHLOROBENZENE	ND (0.24)	ug/L
ETHYLBENZENE	ND (0.3)	ug/L
TOLUENE	0.84	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	ND (0.2)	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	ND (0.25)	ug/L
TRICHLOROFLUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	ND (0.05)	ug/L
DICHLOROETHANE, 1,1-	ND (0.05)	ug/L
TRANS-1,2-DICHLOROETHYLENE	ND (0.05)	ug/L
CHLOROFORM	25	ug/L
DICHLOROETHANE, 1,2-	ND (0.05)	ug/L
TRICHLOROETHANE, 1,1,1-	ND (0.05)	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	25	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	ND (0.05)	ug/L
DIBROMOCHLOROMETHANE	ND (0.09)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.03)	ug/L
TETRACHLOROETHYLENE	0.35	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
DICHLOROBENZENE, 1,3-	ND (0.32)	ug/L
DICHLOROBENZENE, 1,2-	ND (0.15)	ug/L
DICHLOROBENZENE, 1,4-	ND (0.24)	ug/L



# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

Project: A2776  
Report Date: 03-02-85

Client I.D.: GA-5  
ERG Sample No.: 02/125608  
Matrix: GROUND WATER  
Date Sampled: 02-22-85

Parameter	Result	Units
PURGEABLE AROMATICS		
BENZENE	ND (0.3)	ug/L
1,2-DICHLOROBENZENE	ND (0.15)	ug/L
1,3-DICHLOROBENZENE	ND (0.32)	ug/L
1,4-DICHLOROBENZENE	ND (0.24)	ug/L
ETHYLBENZENE	ND (0.3)	ug/L
TOLUENE	0.76	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	ND (0.2)	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	ND (0.25)	ug/L
TRICHLOROFLUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	ND (0.05)	ug/L
DICHLOROETHANE, 1,1-	ND (0.05)	ug/L
TRANS-1,2-DICHLOROETHYLENE	ND (0.05)	ug/L
CHLOROFORM	20	ug/L
DICHLOROETHANE, 1,2-	ND (0.05)	ug/L
TRICHLOROETHANE, 1,1,1-	ND (0.05)	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	25	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	ND (0.05)	ug/L
DIBROMOCHLOROMETHANE	ND (0.09)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.33)	ug/L
TETRACHLOROETHYLENE	0.2	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
DICHLOROBENZENE, 1,3-	ND (0.32)	ug/L
DICHLOROBENZENE, 1,2-	ND (0.15)	ug/L
DICHLOROBENZENE, 1,4-	ND (0.24)	ug/L



# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

Project: A2776  
Report Date: 03-02-85

Client I.D.: GA-6  
ERG Sample No.: 02/125609  
Matrix: GROUND WATER  
Date Sampled: 02-22-85

Parameter	Result	Units
PURGEABLE AROMATICS		
BENZENE	1.7	ug/L
1,2-DICHLOROBENZENE	ND (0.15)	ug/L
1,3-DICHLOROBENZENE	ND (0.32)	ug/L
1,4-DICHLOROBENZENE	ND (0.24)	ug/L
ETHYLBENZENE	4.3	ug/L
TOLUENE	78	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	100	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	450	ug/L
TRICHLOROFLUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	830	ug/L
DICHLOROETHANE, 1,1-	720	ug/L
TRANS-1,2-DICHLOROETHYLENE	4400	ug/L
CHLOROFORM	ND (0.05)	ug/L
DICHLOROETHANE, 1,2-	57	ug/L
TRICHLOROETHANE, 1,1,1-	5700	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	ND (0.04)	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	240	ug/L
DIBROMOCHLOROMETHANE	ND (0.09)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.03)	ug/L
TETRACHLOROETHYLENE	30	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
DICHLOROBENZENE, 1,3-	ND (0.32)	ug/L
DICHLOROBENZENE, 1,2-	ND (0.15)	ug/L
DICHLOROBENZENE, 1,4-	ND (0.24)	ug/L

NO-4227 301

INSTALLATION RESTORATION PROGRAM PHASE 2  
CONFIRMATION/QUANTIFICATION ST. (U) SCIENCE  
APPLICATIONS INTERNATIONAL CORP MCLEAN VA

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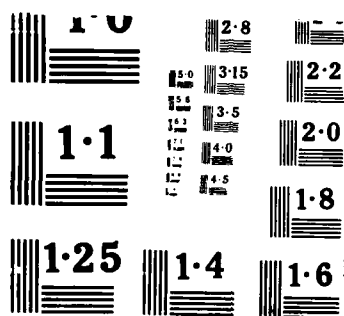
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# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

Project: A2776  
Report Date: 03-02-85

Client I.D.: GA-7  
ERG Sample No.: 02/125610  
Matrix: GROUND WATER  
Date Sampled: 02-22-85

Parameter	Result	Units
PURGEABLE AROMATICS		
BENZENE	19	ug/L
1,2-DICHLOROBENZENE	ND (0.15)	ug/L
1,3-DICHLOROBENZENE	ND (0.32)	ug/L
1,4-DICHLOROBENZENE	ND (0.24)	ug/L
ETHYLBENZENE	ND (0.3)	ug/L
TOLUENE	620	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
PURGEABLES, 601		
CHLOROMETHANE	ND (0.08)	ug/L
BROMOMETHANE	ND (1.2)	ug/L
DICHLORODIFLUOROMETHANE	ND (1.8)	ug/L
VINYL CHLORIDE	ND (0.2)	ug/L
CHLOROETHANE	ND (0.52)	ug/L
METHYLENE CHLORIDE	23000	ug/L
TRICHLOROFLUOROMETHANE	ND (0.1)	ug/L
DICHLOROETHYLENE, 1,1-	19	ug/L
DICHLOROETHANE, 1,1-	41	ug/L
TRANS-1,2-DICHLOROETHYLENE	130	ug/L
CHLOROFORM	ND (0.05)	ug/L
DICHLOROETHANE, 1,2-	0.81	ug/L
TRICHLOROETHANE, 1,1,1-	880	ug/L
CARBON TETRACHLORIDE	ND (0.12)	ug/L
BROMODICHLOROMETHANE	ND (0.1)	ug/L
DICHLOROPROPANE, 1,2-	ND (0.04)	ug/L
TRANS-1,3-DICHLOROPROPENE	ND (0.34)	ug/L
TRICHLOROETHYLENE	8.0	ug/L
DIBROMOCHLOROMETHANE	ND (0.09)	ug/L
TRICHLOROETHANE, 1,1,2-	ND (0.02)	ug/L
CIS-1,3-DICHLOROPROPENE	ND (0.2)	ug/L
CHLOROETHYL VINYL ETHER, 2-	ND (0.13)	ug/L
BROMOFORM	ND (0.20)	ug/L
TETRACHLOROETHANE, 1,1,2,2-	ND (0.03)	ug/L
TETRACHLOROETHYLENE	7.1	ug/L
CHLOROBENZENE	ND (0.25)	ug/L
DICHLOROBENZENE, 1,3-	ND (0.32)	ug/L
DICHLOROBENZENE, 1,2-	ND (0.15)	ug/L
DICHLOROBENZENE, 1,4-	ND (0.24)	ug/L

SD-Sample damaged  
FR-See field report for result  
SR-See attached report  
NA-Result not applicable to test

ND-Nondetected, Detection limit in ( )  
<-Positive result at an unquantifiable  
concentration below indicated level



# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

PROJECT REPORT DATE A1998 06-11-84

117 N. FIRST  
ANN ARBOR, MICHIGAN 48104 (313) 662-3104

CLIENT P.O.: LETTER  
REPORT: 7489

SAMPLES RECVD: 05-18-84  
REFER TECHNICAL QUESTIONS  
TO: FRANK T. HAMMER

CLIENT:  
JRB ASSOCIATES, INC  
8400 WESTPARK DRIVE  
MC LEAN, VA 22102

APPROVED: 

\*\*\*  
RESIDUAL SAMPLES WILL  
BE HELD FOR TWO WEEKS  
\*\*\*

ATTENTION: CLAUDIA WIEGAND

CLIENT I.D.: FHA-1  
ERG SAMPLE NO: 05/108248  
MATRIX: NATURAL WATER  
DATE COLLECTED: 05-17-84

PARAMETER	RESULTS	UNITS
CARBON, TOTAL ORGANIC, HALOSCAN - T	7	mg/L
ORGANIC CHLORIDE	0.02	mg/L
ORGANIC BROMIDE	ND (0.002)	mg/L
ORGANIC IODINE	ND (0.002)	mg/L
OIL AND GREASE BY IR	ND (1)	mg/L

CLIENT I.D.: DAFB-A  
ERG SAMPLE NO: 05/108249  
MATRIX: NATURAL WATER  
DATE COLLECTED: 05-17-84

PARAMETER	RESULTS	UNITS
CARBON, TOTAL ORGANIC, HALOSCAN - T	3	mg/L
ORGANIC CHLORIDE	0.03	mg/L
ORGANIC BROMIDE	ND (0.002)	mg/L
ORGANIC IODINE	ND (0.002)	mg/L
OIL AND GREASE BY IR	ND (1)	mg/L

CLIENT I.D.: DAFB-B  
ERG SAMPLE NO: 05/108250  
MATRIX: NATURAL WATER  
DATE COLLECTED: 05-17-84

PARAMETER	RESULTS	UNITS
CARBON, TOTAL ORGANIC,	2	mg/L





# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

ERG PROJECT NO. A1998 - JRB ASSOCIATES, INC

06-11-84

CLIENT I.D.: DAFB-B  
ERG SAMPLE NO: 05/108250  
MATRIX: NATURAL WATER  
DATE COLLECTED: 05-17-84

PARAMETER	RESULTS	UNITS
HALOSCAN - T		
ORGANIC CHLORIDE	ND (0.01)	mg/L
ORGANIC BROMIDE	ND (0.002)	mg/L
ORGANIC IODINE	ND (0.002)	mg/L
OIL AND GREASE BY IR	ND (1)	mg/L

CLIENT I.D.: DAFB-C  
ERG SAMPLE NO: 05/108251  
MATRIX: NATURAL WATER  
DATE COLLECTED: 05-17-84

PARAMETER	RESULTS	UNITS
CARBON, TOTAL ORGANIC,		
HALOSCAN - T	2	mg/L
ORGANIC CHLORIDE	0.26	mg/L
ORGANIC BROMIDE	ND (0.002)	mg/L
ORGANIC IODINE	ND (0.002)	mg/L
OIL AND GREASE BY IR	<1	mg/L

CLIENT I.D.: DAFB-D  
ERG SAMPLE NO: 05/108252  
MATRIX: NATURAL WATER  
DATE COLLECTED: 05-17-84

PARAMETER	RESULTS	UNITS
CARBON, TOTAL ORGANIC,		
HALOSCAN - T	4	mg/L
ORGANIC CHLORIDE	0.01	mg/L
ORGANIC BROMIDE	ND (0.002)	mg/L
ORGANIC IODINE	ND (0.006)	mg/L
OIL AND GREASE BY IR	1	mg/L

CLIENT I.D.: MW-1  
ERG SAMPLE NO: 05/108253  
MATRIX: NATURAL WATER  
DATE COLLECTED: 05-17-84

PARAMETER	RESULTS	UNITS
CARBON, TOTAL ORGANIC,		
HALOSCAN - T	3	mg/L
ORGANIC CHLORIDE	0.01	mg/L



# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

ERG PROJECT NO. A1998 - JRB ASSOCIATES, INC

06-11-84

CLIENT I.D.: MW-1  
ERG SAMPLE NO: 05/108253  
MATRIX: NATURAL WATER  
DATE COLLECTED: 05-17-84

PARAMETER	RESULTS	UNITS
ORGANIC BROMIDE	0.007	mg/L
ORGANIC IODINE	0.012	mg/L
OIL AND GREASE BY IR	ND (1)	mg/L

CLIENT I.D.: MW-2  
ERG SAMPLE NO: 05/108254  
MATRIX: NATURAL WATER  
DATE COLLECTED: 05-17-84

PARAMETER	RESULTS	UNITS
CARBON, TOTAL ORGANIC, HALOSCAN - T	8	mg/L
ORGANIC CHLORIDE	0.07	mg/L
ORGANIC BROMIDE	0.007	mg/L
ORGANIC IODINE	0.043	mg/L
OIL AND GREASE BY IR	ND (1)	mg/L

CLIENT I.D.: MW-3  
ERG SAMPLE NO: 05/108255  
MATRIX: NATURAL WATER  
DATE COLLECTED: 05-17-84

PARAMETER	RESULTS	UNITS
CARBON, TOTAL ORGANIC, HALOSCAN - T	15	mg/L
ORGANIC CHLORIDE	16	mg/L
ORGANIC BROMIDE	ND (0.004)	mg/L
ORGANIC IODINE	0.027	mg/L
COMMENTS: HIGHER BR DETECTION LIMIT INTERFERENCE FROM HIGH CL CONTENT.		
OIL AND GREASE BY IR	ND (1)	mg/L

FR - SEE FIELD REPORT FOR RESULT  
NA - NOT APPLICABLE TO TEST REQUESTED  
ND - NONDETECTED, DETECTION LIMIT IN ( )  
SD - SAMPLE DAMAGED  
SR - SEE ATTACHED REPORT FOR RESULT  
< - POSITIVE RESULT BUT AT UNQUANTIFIABLE  
CONCENTRATION BELOW INDICATED LEVEL

THANK YOU FOR YOUR BUSINESS !



PROJECT NAME: DAFB

PROJECT NUMBER: 2-812-06-351-54 PAGE 1 OF 1

PAGE

OF

1

COLLECTION LOCATION: **POWELL AFB**

SAMPLERS: ED. TOKARSKI, AL WICKLINE

SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	# OF CONTAINERS	PRESERVATIVES ADDED	REMARKS
FHA-1	5/17	1410	GROUND W.	3	See bottle.	Tax, TDC, O+G.
AFB-A	5/17	1440	"	"	"	"
AFB-B	"	1420	"	"	"	"
AFB-C	"	1435	"	"	"	"
AFB-D	"	1500	"	"	"	"
MW-1	"	1545	"	"	"	"
MW-2	"	1620	"	"	"	"
MW-3	"	1630	"	"	"	"
				24		
				TOTAL		

RELINQUISHED BY:

ED TOKARSKI

DATE/TIME:

REASON:

Shipping 17.35

RECEIVED BY:

M.B. 5117

RELINQUISHED BY:

(FEDERAL EXPRESS  
DELIVERYMAN)

DATE/TIME:

**REASON:**

REASON:  
RECEIVED AT ERG INC FROM  
FEDERAL EXPRESS

RECEIVED BY:

Gug. myrsin.

RELINQUISHED BY:

Aug Karsch

DATE/TIME:

REASON:

TRANSFERRED CUSTODY TO  
SAMPLE CUSTODIAN.

RECEIVED BY:

Wahst k. leber

RELINQUISHED BY:

DATE/TIME:

**REASON :**

RECEIVED BY:

## QUALITY CONTROL SUMMARY

Submitted To:

JRB Associates, Inc.  
8400 Westpark Drive  
McLean, VA 22102

Attn: Claudia Wiegand

Project Number:

A1998      Reference: JRB-Dover

Date Sample Received:

May 20, 1984

Date Sample Extracted:

No extraction

Date Samples Analyzed:

May 23, 1984, and June 1, 2, 1984

Methodology Employed:

Halocarbon Purgeables EPA Method 601  
EPA 600 Method for chemical analysis  
of water and wastes Methods 416.1, 413.2.

Sample Quality Control:

ERG's QA/QC requires a duplicate, method  
spike and blank with each group of samples  
or with every 10 samples, whichever is  
larger.

Enclosed is the Quality Control Summary.

# QUALITY CONTROL REPORT

JRB-DOVER: A1998

SAMPLE NUMBER	PARAMETER	DUPLICATE* VALUE	BLANK VALUE	METHOD SPIKE VALUE	SPIKE LEVEL	RECOVERY %
108255	TOC	14.3/16.6	ND(2)	36.2	20	105
108248	Bromide	ND(0.002)/ND(0.002)	0	10.2	10	102
108248	Chloride	0.01/0.02	0	100	104	104
108248	Iodide	ND(0.002)/ND(0.002)	0	10	9.9	99
-----	**Oil & Grease	-----	-----	-----	-----	-----

\* All analytical results are blank subtracted.

\*\* Oil & Grease there are no duplicates, analyze the entire sample.



# ANALYTICAL REPORT

ENVIRONMENTAL RESEARCH GROUP, INC.

117 N. FIRST  
ANN ARBOR, MICHIGAN 48104 (313) 662-3104

PROJECT A2012  
REPORT DATE 07-18-84

CLIENT P.O.: LETTER  
REPORT: 8221

SAMPLES RECVD: 05-30-84  
REFER TECHNICAL QUESTIONS  
TO: FRANK T. HAMMER

CLIENT:  
JRB ASSOCIATES, INC  
8400 WESTPARK DRIVE  
MC LEAN, VA 22102

APPROVED: 

\*\*\*  
RESIDUAL SAMPLES WILL  
BE HELD FOR TWO WEEKS  
\*\*\*

ATTENTION: CLAUDIA WIEGAND

CLIENT I.D.: WELL #2 LEBANON  
ERG SAMPLE NO: 05/109067  
MATRIX: NATURAL WATER

PARAMETER	RESULTS	UNITS
OIL AND GREASE BY IN	ND (0.5)	mg/L
CARBON, TOTAL ORGANIC,	ND (2)	mg/L

THE TOX ALIQUOT WAS BROKEN IN TRANSIT.

FR - SEE FIELD REPORT FOR RESULT  
NA - NOT APPLICABLE TO TEST REQUESTED  
ND - NONDETECTED, DETECTION LIMIT IN ( )  
SD - SAMPLE DAMAGED  
SE - SEE ATTACHED REPORT FOR RESULT  
PS - POSITIVE RESULT BUT AT UNQUANTIFIABLE  
CONCENTRATION BELOW INDICATED LEVEL

THANK YOU FOR YOUR BUSINESS !

PAGE 1 LAST PAGE

# QUALITY CONTROL SUMMARY

Submitted To:

JRB Associates, Inc.  
8400 Westpark Drive  
McLean, VA 22102

ATTN: Claudia Wiegand

Project Number:

A2012      Reference: JRB-Dover

Date Samples Received:

May 30, 1984

Date Samples Extracted:

No extraction

Date Samples Analyzed:

June 8, 1984  
June 15, 1984

Methodology Employed:

EPA Method for chemical analysis of  
water and wastes. Method 413.2, 416.1

Sample Quality Control:

ERG's QA/QC requires a duplicate, method  
spike and blank with each group of samples  
or with ever- 10 samples, whichever is larger.

Enclosed is the Quality Control Summary.



# QUALITY CONTROL REPORT

JRR DOVER: #A2012

SAMPLE NUMBER	PARAMETER	DUPLICATE VALUE	BLANK VALUE	METHOD SPIKE VALUE	SPIKE LEVEL	% RECOVERY
*109409	TOC	2.5/2.3	ND(2)	20	23.5	105
	* O & G	-----	ND(.5)	--	----	---

\* Oil & Grease: No duplicates, analyze entire sample.

\*\* This sample number is not part of project A2012 but was analyzed with the sample of project #A2012.

28 JUL 1984 130

LABORATORY ANALYSIS REPORT AND RECORD (General)					DATE
TO:		FROM: USAF OEHL/SA Brooks AFB TX 78235			16 Jul 84
SAMPLE IDENTITY WATER				DATE RECEIVED 10 Jul 84	
SAMPLE FROM				LAB CONTROL NR	
TEST FOR Volatile Halocarbons					
Methodology: EPA Method 601					
OEHL NO:	37702.03	37704.05	37706.07	37708.09	DET. LIMIT
BASE NO:	GP840272	GP840273	GP840274	GP840275	
Bromodichloromethane	ND	ND	ND	ND	0.1
Bromoform					0.2
Bromomethane					1.0
Carbon Tetrachloride		ND	ND		0.1
Chlorobenzene		7.6	127		0.2
Chloroethane		ND	ND		0.5
2-Chloroethylvinyl ether	ND	ND		ND	0.1
Chloroform	2.9	0.9		0.4	0.1
Chloromethane	ND	ND		ND	0.1
Dibromochloromethane					0.1
1,2-Dichlorobenzene					0.2
1,3-Dichlorobenzene					0.2
1,4-Dichlorobenzene					0.2
Dichlorodifluoromethane	ND	ND	ND		0.1
1,1-Dichloroethane	0.6	4.1	205		0.2
1,2-Dichloroethane	ND	2.0	7.5		0.2
1,1-Dichloroethene	ND	ND	ND		0.1
trans-1,3-Dichloroethene	2.4	3.1	1800		0.1
1,2-Dichloropropane	ND	ND	ND		0.1
cis-1,3-Dichloropropene					0.2
trans-1,3-Dichloropropene		ND	ND		0.2
Methylene Chloride		0.2	101		0.2
1,1,2,2-Tetrachloroethane	ND	ND	ND		0.1
Tetrachloroethylene	36	12	2300		0.1
1,1,1-Trichloroethane	9.8	28	4250		0.1
1,1,2-Trichloroethane	ND	ND	ND		0.1
Trichloroethylene	38	140	2250		0.1
Trichlorofluoromethane	ND	ND	110		0.1
Vinyl Chloride	ND	ND	ND	ND	0.2
Results in Micrograms per Liter					
LeROY P. GEORGE, GS-12 Chief, Trace Organics Section		<p><i>analysis reviewed 24 July 1984 as identified above this data does not agree with previous results concerning wells #2 &amp; #5. Based on data above #2 well is more contaminated than #3. I assume the wells were not identified properly and data for well #2 is actually for #3, and vice versa.</i></p> <p>LINDSEY O. WATERHOUSE, CAPT, USAF, BS Bioenvironmental Engineer</p>			
REQUESTING AGENCY (Mailing Address)					
USAF HOSP/SGPB DOVER AFB DE 19902-3006					

## LABORATORY PERFORMING ANALYSIS

## 2. LAB SAMPLE NUMBER

## 3. REQUESTOR SAMPLE NO

OEHL

39490

00008

GL840277

00029

## SAMPLE COLLECTION INFORMATION

## 7. SITE DESCRIPTION

4. DATE RECEIVED BY  
LAB 175-1484  
130-2845. DATE ANALYSIS  
COMPLETED  
13 Aug. 84

## ON-SITE ANALYTICAL RESULTS

## 8. SITE LOCATION NO

## 9. FLOW RATE AT SITE

## 10. WEATHER

## 11. WATER TEMP 17 °F

## 12. DISS O2

00058  
GAL/MIN00400  
UNITS00300  
MG/L

## 11. COLLECTION DATE/PERIOD

## 12. COLLECTORS NAME

## 13. RESULTS OF OTHER ON-SITE ANALYSES

## 13. SAMPLING TECHNIQUE

## 14. PHONE NUMBER

## 15. REASON FOR SAMPLE SUBMISSION

NPDES #

## ANALYSES REQUESTED AND RESULTS

## PRESERVATION GROUP A

PARAMETER	TOTAL	MG/L
Chemical Oxygen Demand	00340	.
Total Organic Carbon as C	00680	.

## PRESERVATION GROUP F

PARAMETER	DISC	TOTAL	MG/L
ARSENIC	01000	01002	.
BARIUM	01005	01007	.
CADMIUM	01025	01027	57.2

## PRESERVATION GROUP G

PARAMETER	TOTAL	MG/L
BORON	01022	48
BORON, Dissolved	01020	48
CHLORIDE	00940	.

## PRESERVATION GROUP B

PARAMETER	TOTAL	MG/L
Oil & GREASE FREON-IR Method	00560	7.5

## PRESERVATION GROUP E

PARAMETER	DISC	TOTAL	MG/L
CHROMIUM	01030	01034	18.5
CHROMIUM hexavalent		01032	.
COPPER	01040	01042	41.4

## PRESERVATION GROUP H

PARAMETER	TOTAL	MG/L
COLOR	00080	Units
FLUORIDE	00951	.
Residue Fil- terable (TDS)	00515	.

## PRESERVATION GROUP C

PARAMETER	TOTAL	MG/L
AMMONIA as N	00610	.
NITRATE as N Cd Reduct. Method	00620	.
NITRITE as N	00615	.

## PRESERVATION GROUP I

PARAMETER	DISC	TOTAL	MG/L
IRON	01040	01042	11240
LEAD	01040	01051	289
MANGANESE	01050	01055	166.9

## PRESERVATION GROUP J

PARAMETER	TOTAL	MG/L
Residue	00500	.
Residue Volatile	00505	.
Specific Conductance	00095	µmhos

TOTAL KJELDAHL  
NITROGEN as N

PHOSPHORUS Ortho PO4 as P	70507	.
PHOSPHORUS as P	00665	.

## PRESERVATION GROUP K

PARAMETER	DISC	TOTAL	MG/L
NICKEL	01060	01067	16.7
SELENIUM	01145	01147	.
SILVER	01075	01077	.

## PRESERVATION GROUP L

PARAMETER	TOTAL	MG/L
SULFATE as SO4	00945	.
SURFACTANTS MBAS as LAS	38260	.
TURBIDITY	00076	Units

## PRESERVATION GROUP D

PARAMETER	TOTAL	MG/L
CYANIDE	00720	.
CYANIDE Free, Amenable to Cl2	00722	.

## PRESERVATION GROUP M

PARAMETER	DISC	TOTAL	MG/L
CALCIUM as Ca	00915	00916	mg/l
MAGNESIUM as Mg	00925	00927	mg/l
POTASSIUM	00935	00937	mg/l
SODIUM	00930	00929	mg/l

## PRESERVATION GROUP N

PARAMETER	TOTAL	MG/L

## PRESERVATION GROUP E

PARAMETER	TOTAL	MG/L
PHENOLS	32730	0.4

## PRESERVATION GROUP F

PARAMETER	DISC	TOTAL	MG/L

## PRESERVATION GROUP G

PARAMETER	TOTAL	MG/L

## 1. ORGANIZATION REQUESTING ANALYSIS

## CHEMIST

EM MS Sms REL

## REVIEWED BY

## APPROVED BY

SF 12.03

2. LABORATORY PERFORMING ANALYSIS <b>OEHL</b>			3. LAB SAMPLE NUMBER <b>39489</b>			4. REQUESTOR SAMPLE NO <b>GL840276</b>			
5. SAMPLE COLLECTION INFORMATION						6. DATE RECEIVED BY LAB <b>17 July 84</b>		7. DATE ANALYSIS COMPLETED <b>8 Aug. 84</b>	
8. SITE DESCRIPTION						9. ON-SITE ANALYTICAL RESULTS			
10. SITE LOCATION NO		11. FLOWRATE AT SITE 00058 GAL/MIN		12. WEATHER		13. WATER TEMP 17.7H		14. DISS O <sub>2</sub> 00400 UNITS	
15. COLLECTION DATE PERIOD				16. COLLECTORS NAME		17. RESULTS OF OTHER ON-SITE ANALYSES <i>Sledge from lagoon #1</i>			
18. SAMPLING TECHNIQUE				19. PHONE NUMBER					
20. REASON FOR SAMPLE SUBMISSION NPOES *									
ANALYSES REQUESTED AND RESULTS									
PRESERVATION GROUP A			205 PRESERVATION GROUP F			PRESERVATION GROUP G			
PARAMETER	TOTAL	MG/L	PARAMETER	DISS	TOTAL	MG/L	PARAMETER	TOTAL	MG/L
Chemical Oxygen Demand	00340	.	ARSENIC	01000	01002	.	BORON	01022	46
Total Organic Carbon as C	00680	.	BARIUM	01005	01007	.	BORON, Dissolved	01020	46
		.	CADMIUM	01025	01027	631	CHLORIDE	00940	.
		.	CHROMIUM	01030	01034	3010	COLOR	00080	Units
		.	CHROMIUM Hexavalent		01032	.	FLUORIDE	00951	.
		.	COPPER	01040	01042	373	Residue Fil-terable (IDS)	00515	.
		.	IRON	01040	01045	2226	Residue Non Fil- (SS)	00530	.
		.	LEAD	01049	01051	2018	Residue	00500	.
		.	MANGANESE	01056	01055	88.0	Residue Volatile	00505	.
		.	MERCURY	71890	71900	.	Specific Conductance	00095	µmhos
		.	NICKEL	01065	01067	1.5 26.6	SULFATE as SO <sub>4</sub>	00945	.
		.	SELENIUM	01145	01147	.	SURFACTANTS MBAS as LAS	38260	.
		.	SILVER	01075	01077	3.7	TURBIDITY	00076	Units
		.	ZINC	01090	01092	748			
PRESERVATION GROUP D			CALCIUM as Ca			00915	00916		
PARAMETER	TOTAL	MG/L	MAGNESIUM as Mg			00925	00927		
CYANIDE	00720	.	POTASSIUM			00935	00937		
CYANIDE Free, Amenable to Cl <sub>2</sub>	00722	.	SODIUM			00930	00929		
PRESERVATION GROUP E			PRESERVATION GROUP J						
PARAMETER	TOTAL	MG/L	PARAMETER						
PHENOLS	02730	120							
21. ORGANIZATION REQUESTING ANALYSIS <i>Reviewed 11 Sept. 1984</i> <i>Linda L. Wilkerson</i> <b>USAF HOSP/SGP</b> <b>Dover AFB DE 19002</b> <b>008-56-6670</b> <b>USAF Hospital Dover</b>						22. CHEMIST <b>E H SMITH MS</b> 23. REVIEWED BY <i>[Signature]</i>			

2. LABORATORY PERFORMING ANALYSIS <div style="font-size: 24pt; font-weight: bold;">OEHL</div>			3. LAB SAMPLE NUMBER <div style="font-size: 24pt; font-weight: bold;">39492</div>			4. REQUESTOR SAMPLE NO <div style="font-size: 24pt; font-weight: bold;">GL840279</div>			
SAMPLE COLLECTION INFORMATION						5. DATE RECEIVED BY LAB <div style="font-size: 18pt; font-weight: bold;">173. 84</div>		6. DATE ANALYSIS COMPLETED <div style="font-size: 18pt; font-weight: bold;">13 Aug. 84</div>	
7. SITE DESCRIPTION						ON-SITE ANALYTICAL RESULTS			
8. SITE LOCATION NO		9. FLOWRATE AT SITE 00056 GAL/MIN		10. WEATHER 00041		16. WATER TEMP 20.10 °C		17. PH 00400 UNITS	
11. COLLECTION DATE/PERIOD		12. COLLECTOR'S NAME		Sludge from lagoon #2					
13. SAMPLING TECHNIQUE		14. PHONE NUMBER							
15. REASON FOR SAMPLE SUBMISSION NPOES *									
ANALYSES REQUESTED AND RESULTS									
PRESERVATION GROUP A			PRESERVATION GROUP F <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">264</span>				PRESERVATION GROUP G		
PARAMETER	TOTAL	MG/L	PARAMETER	DISS	TOTAL	µG/L	PARAMETER	TOTAL	MG/L
Chemical Oxygen Demand	00340	.	ARSENIC	01000	01002	.	BORON	01022	<div style="font-size: 12pt;">48 1</div>
Total Organic CARBON as C	00680	.	BARIIUM	01005	01007	.	BORON, Dissolved	01020	<div style="font-size: 12pt;">48 1</div>
PRESERVATION GROUP B <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">267</span>			CADMIUM				CHLORIDE		
PARAMETER	TOTAL	MG/gram	CHROMIUM	01030	<span style="border: 1px solid black; border-radius: 50%; padding: 2px;">01034</span>	<div style="font-size: 12pt;">489.5</div>	COLOR		
OIL & GREASE FREON-IR Method	<span style="border: 1px solid black; border-radius: 50%; padding: 2px;">00560</span>	<div style="font-size: 12pt;">435. 50mg/L</div>	CHROMIUM Hexavalent		01032	<div style="font-size: 12pt;">72.</div>	FLUORIDE		
PRESERVATION GROUP C			COPPER				Residue Fil-terable (TDS)		
PARAMETER	TOTAL	MG/L	IRON	01046	<span style="border: 1px solid black; border-radius: 50%; padding: 2px;">01045</span>	<div style="font-size: 12pt;">6240.</div>	Residue Non Filt (SS)		
AMMONIA as N	00610	.	LEAD	01049	<span style="border: 1px solid black; border-radius: 50%; padding: 2px;">01051</span>	<div style="font-size: 12pt;">2490.</div>	Residue		
NITRATE as N Cd Reduct. Method	00620	.	MANGANESE	01056	<span style="border: 1px solid black; border-radius: 50%; padding: 2px;">01055</span>	<div style="font-size: 12pt;">2300.</div>	Residue Volatile		
NITRITE as N	00615	.	MERCURY	71890	71900	<div style="font-size: 12pt;">1.0.</div>	Specific Conductance		
TOTAL KJELDAHL NITROGEN as N	00625	.	NICKEL	01065	<span style="border: 1px solid black; border-radius: 50%; padding: 2px;">01067</span>	<div style="font-size: 12pt;">104.</div>	SULFATE as SO <sub>4</sub>		
PHOSPHORUS Ortho PO <sub>4</sub> as P	70507	.	SELENIUM	01145	01147	.	SURFACTANTS MBAS as LAS		
PHOSPHORUS as P	00665	.	SILVER	01075	01077	<div style="font-size: 12pt;">10.</div>	TURBIDITY		
PRESERVATION GROUP D			ZINC				<div style="font-size: 12pt;">403.</div>		
PARAMETER	TOTAL	MG/L	CALCIUM as Ca	00915	00916	<div style="font-size: 12pt;">mg 1</div>			
CYANIDE	00720	.	MAGNESIUM as Mg	00925	00927	<div style="font-size: 12pt;">mg 1</div>			
CYANIDE Free, Amenable to Cl <sub>2</sub>	00722	.	POTASSIUM	00935	00937	<div style="font-size: 12pt;">mg 1</div>			
PRESERVATION GROUP E <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">260</span>			SODIUM				<div style="font-size: 12pt;">mg 1</div>		
PARAMETER	TOTAL	µg/gram	PRESERVATION GROUP J						
PHENOLS	<span style="border: 1px solid black; border-radius: 50%; padding: 2px;">32730</span>	<div style="font-size: 12pt;">72. 4.0</div>	PARAMETER						
1. ORGANIZATION REQUESTING ANALYSIS						CHEMIST <div style="font-size: 18pt; font-weight: bold;">H. S. REL</div>			
						REVIEWED BY			
						APPROVED BY <div style="font-size: 24pt; font-weight: bold;">D. L. R. D.</div>			

SF 12.03

2. LABORATORY PERFORMING ANALYSIS			3. LAB SAMPLE NUMBER			4. REQUESTOR SAMPLE NO			
OEHL			39491			GL 840278			
5. SAMPLE COLLECTION INFORMATION						6. DATE RECEIVED BY LAB		7. DATE ANALYSIS COMPLETED	
7. SITE DESCRIPTION						17JUL84		13 AUG 84	
8. SITE LOCATION NO						9. FLOWRATE AT SITE		10. WEATHER	
						00058 GAL/MIN			
11. COLLECTION DATE/PERIOD						12. COLLECTORS NAME		13. RESULTS OF OTHER ON-SITE ANALYSES	
13. SAMPLING TECHNIQUE						14. PHONE NUMBER		Sludge from waste water lagoon #1	
15. REASON FOR SAMPLE SUBMISSION									
NPOES #									
ANALYSES REQUESTED AND RESULTS									
PRESERVATION GROUP A			PRESERVATION GROUP F			PRESERVATION GROUP G			
PARAMETER	TOTAL	MG/L	PARAMETER	DISS	TOTAL	MG/L	PARAMETER	TOTAL	MG/L
CHEMICAL OXYGEN DEMAND	00340	.	ARSENIC	01000	01002	.	BORON	01022	UG/L
TOTAL ORGANIC CARBON as C	00680	.	BARIUM	01005	01007	.	BORON, Dissolved	01020	UG/L
		.	CADMIUM	01025	01027	238	CHLORIDE	00940	.
		.	CHROMIUM	01030	01034	3673	COLOR	00080	Units
		.	CHROMIUM Hexavalent		01032	1.0	FLUORIDE	00951	.
		.	COPPER	01040	01042	38.5	Residue Filterable (TDS)	00515	.
		.	IRON	01040	01045	419.6	Residue Non Filter (SS)	00530	.
		.	LEAD	01049	01051	2078	Residue	00500	.
		.	MANGANESE	01056	01055	17.7	Residue Volatile	00505	.
		.	MERCURY	71890	71900	.	Specific Conductance	00095	µmhos
		.	NICKEL	01065	01067	126.3	SULFATE as SO4	00945	.
		.	SELENIUM	01145	01147	.	SURFACTANTS MBAS as LAS	38260	.
		.	SILVER	01075	01077	.	TURBIDITY	00076	Units
		.	ZINC	01090	01092	128.6			
PRESERVATION GROUP D			CALCIUM as Ca			00915	00916	mg/l	
PARAMETER	TOTAL	MG/L	MAGNESIUM as Mg			00925	00927	mg/l	
CYANIDE	00720	.	POTASSIUM			00935	00937	mg/l	
CYANIDE Free, Amenable to Cl2	00722	.	SODIUM			00930	00929	mg/l	
		.							
PRESERVATION GROUP E			PRESERVATION GROUP J						
PARAMETER	TOTAL	µg/g	PARAMETER						
PHENOLS	32730	580							
		.							
1. ORGANIZATION REQUESTING ANALYSIS						CHEMIST			
Received 11 Sept. 1984						EM 5-5 DEL 09			
Lindsey C. Waterhouse						REVIEWED BY			
LINDSEY C. WATERHOUSE, Capt, USN						APPROVED BY			
Chief, Bioenvironmental Engineering						D. J. Bird			
008-36-8670									
Naval Hospital, Dover									

2. LABORATORY PERFORMING ANALYSIS <b>OEHL</b>			3. LAB SAMPLE NUMBER <b>39494</b>			4. REQUESTOR SAMPLE NO <b>GL840281</b>				
SAMPLE COLLECTION INFORMATION						5. DATE RECEIVED BY LAB <b>17 JUL 84</b>		6. DATE ANALYSIS COMPLETED <b>13 AUG 84</b>		
7. SITE DESCRIPTION						ON-SITE ANALYTICAL RESULTS				
8. SITE LOCATION NO		9. FLOWRATE AT SITE 00058 GAL/MIN		10. WEATHER 00041		15. WATER TEMP 00 10 °C		16. DISS O <sub>2</sub> 00400 UNITS		
11. COLLECTION DATE/PERIOD				12. COLLECTOR'S NAME		<b>Sludge from lagoon #2</b>				
13. SAMPLING TECHNIQUE				14. PHONE NUMBER						
15. REASON FOR SAMPLE SUBMISSION NPDES #										
ANALYSES REQUESTED AND RESULTS										
PRESERVATION GROUP A			PRESERVATION GROUP F			PRESERVATION GROUP G				
PARAMETER	TOTAL	MG/L	PARAMETER	DISS	TOTAL	µg/g	PARAMETER	TOTAL	MG/L	
Chemical Oxygen Demand	00340	.	ARSENIC	01000	01002	.	BORON	01022	µg/l	
Total Organic CARBON as C	00680	.	BARIUM	01005	01007	.	BORON, Dissolved	01020	µg/l	
		.	CADMIUM	01025	01027	85.6	CHLORIDE	00940	.	
PRESERVATION GROUP B			CHROMIUM			01030	01034	3357.	COLOR	00080 Units
OIL & GREASE FREON-IR Method	00560	420.	CHROMIUM hexavalent		01032	.	FLUORIDE	00951	.	
			COPPER	01040	01042	100.8	Residue Fil-terable (TDS)	00515	.	
PRESERVATION GROUP C			IRON			01040	01045	1357.	Residue Non Filtr (SS)	00530
AMMONIA as N	00610	.	LEAD	01049	01051	933.	Residue	00500	.	
NITRATE as N Cd Reduct. Method	00620	.	MANGANESE	01056	01055	41.1	Residue Volatile	00505	.	
NITRITE as N	00615	.	MERCURY	71890	71900	.	Specific Conductance	00095	µmhos	
TOTAL KJELDAHL NITROGEN as N	00625	.	NICKEL	01065	01067	8.9	SULFATE as SO <sub>4</sub>	00945	.	
PHOSPHORUS Ortho PO <sub>4</sub> as P	70507	.	SELENIUM	01145	01147	.	SURFACTANTS MBAS as LAS	38260	.	
PHOSPHORUS as P	00665	.	SILVER	01075	01077	.	TURBIDITY	00076	Units	
			ZINC	01090	01092	367.5				
PRESERVATION GROUP D			CALCIUM as Ca			00915	00916	mg/l		
CYANIDE	00720	.	MAGNESIUM as Mg	00925	00927	mg/l				
CYANIDE Free, Amenable to Cl <sub>2</sub>	00722	.	POTASSIUM	00935	00937	mg/l				
			SODIUM	00930	00929	mg/l				
PRESERVATION GROUP E						PRESERVATION GROUP J				
PARAMETER	TOTAL	µg/g				PARAMETER				
PHENOLS	32730	87.								
1. ORGANIZATION REQUESTING ANALYSIS						CHEMIST <b>EH B3 Sng REL</b>				
						REVIEWED BY				
						APPROVED BY <b>D. J. Bird</b>				

2. LABORATORY PERFORMING ANALYSIS <b>OEHL</b>			3. LAB SAMPLE NUMBER <b>39493</b>			4. REQUESTOR SAMPLE NO <b>GL840280</b>			00029
SAMPLE COLLECTION INFORMATION						5. DATE RECEIVED BY LAB <b>17 JUL 84</b>		6. DATE ANALYSIS COMPLETED <b>13 AUG 84</b>	
7. SITE DESCRIPTION						ON-SITE ANALYTICAL RESULTS			
8. SITE LOCATION NO		9. FLOWRATE AT SITE 00058 GAL/MIN		10. WEATHER 2024		11. WATER TEMP °C		12. PH 00400 UNITS	
11. COLLECTION DATE/PERIOD				12. COLLECTORS NAME		13. RESULTS OF OTHER ON-SITE ANALYSES <i>Sludge from lagoon #2</i>			
13. SAMPLING TECHNIQUE				14. PHONE NUMBER					
15. REASON FOR SAMPLE SUBMISSION NPDES									
ANALYSES REQUESTED AND RESULTS									
PRESERVATION GROUP A			PRESERVATION GROUP F			PRESERVATION GROUP G			
PARAMETER	TOTAL	MG/L	PARAMETER	DISS	TOTAL	µG/gram	PARAMETER	TOTAL	MG/L
Chemical Oxygen Demand	00340	.	ARSENIC	01000	01002	.	BORON	01022	<i>4.8</i>
Total Organic CARBON as C	00680	.	BARIUM	01005	01007	.	BORON, Dissolved	01020	<i>4.8</i>
		.	CADMIUM	01025	01027	<i>165</i>	CHLORIDE	00940	.
		.	CHROMIUM	01030	01034	<i>298.50</i>	COLOR	00080	Units
PRESERVATION GROUP B			CHROMIUM Hexavalent				FLUORIDE	00951	.
OIL & GREASE FREON-IR Method	00560	<i>240</i>	COPPER	01040	01042	<i>26.6</i>	Residue Filtrable (TDS)	00515	.
		.	IRON	01040	01045	<i>81.7</i>	Residue Non Filtr (SS)	00530	.
PRESERVATION GROUP C			LEAD			<i>132.1</i>	Residue	00500	.
AMMONIA as N	00610	.	MANGANESE	01056	01055	<i>28.1</i>	Residue Volatile	00505	.
NITRATE as N Cd Reduct. Method	00620	.	MERCURY	71890	71900	.	Specific Conductance	00095	µmhos
NITRITE as N	00615	.	NICKEL	01065	01067	<i>6.1</i>	SULFATE as SO <sub>4</sub>	00945	.
TOTAL KJELDAHL NITROGEN as N	00625	.	SELENIUM	01145	01147	.	SURFACTANTS MBAS as LAS	38260	.
PHOSPHORUS Ortho PO <sub>4</sub> as P	70507	.	SILVER	01075	01077	<i>3.0</i>	TURBIDITY	00076	Units
PHOSPHORUS as P	00665	.	ZINC	01090	01092	<i>264.3</i>			
PRESERVATION GROUP D			CALCIUM as Ca			00915	00916	<i>mg/l</i>	
PARAMETER	TOTAL	MG/L	MAGNESIUM as Mg			00925	00927	<i>mg/l</i>	
CYANIDE	00720	.	POTASSIUM			00935	00937	<i>mg/l</i>	
CYANIDE Free, Amenable to Cl <sub>2</sub>	00722	.	SODIUM			00930	00929	<i>mg/l</i>	
PRESERVATION GROUP E			PRESERVATION GROUP J						
PARAMETER	TOTAL	µG/gram	PARAMETER						
PHENOLS	32730	<i>42</i>							
1. ORGANIZATION REQUESTING ANALYSIS <i>Received 11 Sept. 84</i> <i>Lindsey C. Waterhouse</i> LINDSEY C. WATERHOUSE, Captain Chief, Bioenvironmental Engineering 008-36-6670 USAF Hospital Dover						CHEMIST EH SWS REL <i>REL</i> REVIEWED BY APPROVED BY <i>D. J. B. B.</i>			



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2. LABORATORY PERFORMING ANALYSIS <b>OEHL</b>			3. LAB SAMPLE NUMBER <b>39495</b>			1. REQUESTOR SAMPLE NO <b>GT840282</b>			
SAMPLE COLLECTION INFORMATION						4. DATE RECEIVED BY LAB <b>17 JUL 84</b>		5. DATE ANALYSIS COMPLETED <b>13 AUG 84</b>	
7. SITE DESCRIPTION						ON-SITE ANALYTICAL RESULTS			
8. SITE LOCATION NO		9. FLOW RATE AT SITE 00056 GAL/MIN		10. WEATHER 00147		11. WATER TEMP 17.5 °C		12. DISS O2 00300 MG/L	
13. COLLECTION DATE/PERIOD				12. COLLECTOR'S NAME		19. RESULTS OF OTHER ON-SITE ANALYSES			
13. SAMPLING TECHNIQUE				14. PHONE NUMBER		<i>Liquid from middle of stream #1</i>			
15. REASON FOR SAMPLE SUBMISSION NPDES									
ANALYSES REQUESTED AND RESULTS									
PRESERVATION GROUP A			PRESERVATION GROUP F			PRESERVATION GROUP G			
PARAMETER	TOTAL	MG/L	PARAMETER	DISS	TOTAL	MG/L	PARAMETER	TOTAL	MG/L
Chemical Oxygen Demand	00340	.	ARSENIC	01000	01002	.	BORON	01022	<i>48</i>
Total Organic Carbon as C	00680	.	BARIUM	01005	01007	.	BORON, Dissolved	01020	<i>48</i>
		.	CADMIUM	01025	01027	<i>&lt;10</i>	CHLORIDE	00940	.
		.	CHROMIUM	01030	01034	<i>664</i>	COLOR	00080	Units
		<i>500</i>	CHROMIUM Hexavalent		01032	<i>272</i>	FLUORIDE	00951	.
			COPPER	01040	01042	<i>36</i>	Residue Filtrable (TDS)	00515	.
			IRON	01046	01045	<i>4880</i>	Residue Non Filtr (SS)	00530	.
			LEAD	01049	01051	<i>89</i>	Residue	00500	.
			MANGANESE	01056	01055	<i>215</i>	Residue Volatile	00505	.
			MERCURY	71890	71900	.	Specific Conductance	00095	<i>µmhos</i>
			NICKEL	01065	01067	<i>52</i>	SULFATE as SO <sub>4</sub>	00945	.
			SELENIUM	01145	01147	.	SURFACTANTS MBAS as LAS	38260	.
			SILVER	01075	01077	.	TURBIDITY	00076	Units
			ZINC	01090	01092	<i>119</i>			
PRESERVATION GROUP D			CALCIUM as Ca			00915	00916		
PARAMETER	TOTAL	MG/L	MAGNESIUM as Mg			00925	00927		
CYANIDE	00720	.	POTASSIUM			00935	00937		
CYANIDE Free, Amenable to Cl <sub>2</sub>	00722	.	SODIUM			00930	00929		
PRESERVATION GROUP E						PRESERVATION GROUP J			
PARAMETER	TOTAL	MG/L				PARAMETER			
PHENOLS	32730	<i>27200</i>							
		<i>4575</i>							
1. ORGANIZATION REQUESTING ANALYSIS						CHEMIST			
<i>Reviewed 11 Sept. 84</i> <i>Lindsey C. Atchison</i> LINDSEY C. ATCHISON Chief, Bioenvironmental Engineering/SGPB 008-36-8670						<i>DRB EH 5ms REL</i> REVIEWED BY			
						APPROVED BY			
						<i>D. L. R. D.</i>			

## NON-POTABLE WATER ANALYSIS

2. LABORATORY PERFORMING ANALYSIS <b>OEHL</b>			3. LAB SAMPLE NUMBER <b>39499</b>			4. REQUESTOR SAMPLE NO <b>GT840286</b>			
SAMPLE COLLECTION INFORMATION						5. DATE RECEIVED BY LAB <b>175-1174</b>		6. DATE ANALYSIS COMPLETED <b>13 Aug 84</b>	
7. SITE DESCRIPTION						ON-SITE ANALYTICAL RESULTS 16. WATER TEMP 17. PH 18. DISS O <sub>2</sub> 19. RESULTS OF OTHER ON-SITE ANALYSES <i>Sludge from separator #2</i>			
8. SITE LOCATION NO		9. FLOWRATE AT SITE 00058 GAL/MIN		10. WEATHER 0004					
11. COLLECTION DATE/PERIOD			12. COLLECTORS NAME			13. WATER TEMP °C		17. PH	
13. SAMPLING TECHNIQUE			14. PHONE NUMBER			00400 UNITS		00300 MG/L	
15. REASON FOR SAMPLE SUBMISSION NPDES #									
ANALYSES REQUESTED AND RESULTS									
PRESERVATION GROUP A			(205) PRESERVATION GROUP F			PRESERVATION GROUP G			
PARAMETER	TOTAL	MG/L	PARAMETER	DISS	TOTAL	µG/gm	PARAMETER	TOTAL	MG/L
Chemical Oxygen Demand	00340	.	ARSENIC	01000	01002	.	BORON	01022	µg/l
Total Organic Carbon as C	00680	.	BARIUM	01005	01007	.	BORON, Dissolved	01020	µg/l
		.	CADMIUM	01025	01027	357.2	CHLORIDE	00940	.
(217) PRESERVATION GROUP B			CHROMIUM			1229.8			
PARAMETER	TOTAL	MG/gm	CHROMIUM Hexavalent	01030	01034	40.	COLOR	00080	Units
OIL & GREASE FREON-IR Method	00560	43200.	COPPER	01040	01042	94.2	FLUORIDE	00951	.
PRESERVATION GROUP C			IRON			3292.			
PARAMETER	TOTAL	MG/L	LEAD	01046	01045	2416.	Residue Filtrable (TDS)	00515	.
AMMONIA as N	00610	.	MANGANESE	01049	01051	1721.	Residue Non Filtr (SS)	00530	.
NITRATE as N Cd Reduct. Method	00620	.	MERCURY	01056	01055	1.0.	Residue Volatile	00505	.
NITRITE as N	00615	.	NICKEL	01065	01067	35.3	Specific Conductance	00095	µmhos
TOTAL KJELDAHL NITROGEN as N	00625	.	SELENIUM	01065	01067	960.	SULFATE as SO <sub>4</sub>	00945	.
PHOSPHORUS Ortho PO <sub>4</sub> as P	70507	.	SILVER	01075	01077	.	SURFACTANTS MBAS as LAS	38260	.
PHOSPHORUS as P	00665	.	ZINC	01075	01077	.	TURBIDITY	00076	Units
PRESERVATION GROUP D			CALCIUM as Ca			00915 00916			
PARAMETER	TOTAL	MG/L	MAGNESIUM as Mg	00925	00927	mg/l			
CYANIDE	00720	.	POTASSIUM	00935	00937	mg/l			
CYANIDE Free, Amenable to Cl <sub>2</sub>	00722	.	SODIUM	00930	00929	mg/l			
(221) PRESERVATION GROUP E			PRESERVATION GROUP J						
PARAMETER	TOTAL	µg/gm							
PHENOLS	32730	112.							
1. ORGANIZATION REQUESTING ANALYSIS						CHEMIST			
<i>Received 11 Sept. 1984</i> <i>Lindsey C. Waterhouse</i> <b>LINDSEY C. WATERHOUSE, Capt, USAF</b> Chief, Bioenvironmental Engineering 008-36-8670 USAF Hospital Dover						REVIEWED BY			
						APPROVED BY			
						<i>D. J. B. B.</i>			

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1. LABORATORY PERFORMING ANALYSIS <b>OEHL</b>			2. LAB SAMPLE NUMBER <b>40412-13</b>			3. REQUESTOR SAMPLE NO <b>GN840292</b> 00020			
4. SAMPLE COLLECTION INFORMATION						5. DATE RECEIVED BY LAB <b>23 JUL 84</b>		6. DATE ANALYSIS COMPLETED <b>8 Aug. 84</b>	
7. SITE DESCRIPTION						8. ON-SITE ANALYTICAL RESULTS			
9. SITE LOCATION NO		10. FLOW RATE AT SITE 00058 GAL/MIN		11. WEATHER		12. WATER TEMP 23.12 °C		13. PH 00400 UNITS	
14. COLLECTION DATE/TIME <b>23 JUL 2 03 PM '84</b>		15. COLLECTOR'S NAME		16. REF TO OTHER ON-SITE ANALYSES <b>outlet left lagoon</b>					
17. SAMPLING TECHNIQUE		18. PHONE NUMBER							
19. REASON FOR SAMPLE SUBMISSION									
20. NOTES									
21. ANALYSES REQUESTED AND RESULTS									
12. PRESERVATION GROUP A <b>207</b>			PRESERVATION GROUP F			PRESERVATION GROUP G			
PARAMETER	TOTAL	MG/L	PARAMETER	DISS	TOTAL	MG/L	PARAMETER	TOTAL	MG/L
Chemical Oxygen Demand	00340	<b>35.</b>	ARSENIC	01000	01002		BORON	01022	<b>4.8</b>
Total Organic Carbon as C	00680	.	BARIUM	01005	01007		BORON, Dissolved	01020	<b>4.8</b>
13. PRESERVATION GROUP B <b>207</b>			CADMIUM	01025	01027		CHLORIDE	00940	.
PARAMETER	TOTAL	MG/L	CHROMIUM	01030	01034		COLOR	00080	Units
OIL & GREASE FREDON-IR Method	00560	<b>300.0</b>	CHROMIUM Hexavalent		01032		FLUORIDE	00951	.
PRESERVATION GROUP C			COPPER	01040	01042		Residue Fil-terable (TDS)	00515	.
PARAMETER	TOTAL	MG/L	IRON	01040	01045		Residue Non Filtr (SS)	00530	.
AMMONIA as N	00610	.	LEAD	01049	01051		Residue	00500	.
NITRATE as N Cd Reduct. Method	00620	.	MANGANESE	01056	01055		Residue Volatile	00505	.
NITRITE as N	00615	.	MERCURY	71890	71900		Specific Conductance	00095	µmhos
TOTAL KJELDAHL NITROGEN as N	00625	.	NICKEL	01065	01067		SULFATE as SO <sub>4</sub>	00945	.
PHOSPHORUS Orth. PO <sub>4</sub> as P	00507	.	SELENIUM	01145	01147		SURFACTANTS MBAS as LAS	38260	.
PHOSPHORUS as P	00665	.	SILVER	01075	01077		TURBIDITY	00076	Units
PRESERVATION GROUP D			ZINC	01090	01092				
PARAMETER	TOTAL	MG/L	CALCIUM as Ca	00915	00916	<b>mg/l</b>			
YANIDE	00720	.	MAGNESIUM as Mg	00925	00927	<b>mg/l</b>			
YANIDE Free, Available to Cl <sub>2</sub>	00722	.	POTASSIUM	00935	00937	<b>mg/l</b>			
			SODIUM	00930	00929	<b>mg/l</b>			
PRESERVATION GROUP E							PRESERVATION GROUP J		
PARAMETER	TOTAL	MG/L					PARAMETER		
PHENOLS	32730	.							
22. ORGANIZATION REQUESTING ANALYSIS <b>Alonec AFB HCU</b>						23. CHEMIST <b>REL S-5 dfo</b>			
						24. REVIEWED BY			
						25. APPROVED BY <b>D-2-B-2</b>			

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2. LABORATORY PERFORMING ANALYSIS <b>OEHL</b>			3. LAB SAMPLE NUMBER <b>40414-</b>			4. REQUESTOR SAMPLE NO <b>G-N840293</b>			
SAMPLE COLLECTION INFORMATION						5. DATE RECEIVED BY LAB <b>23 JUL 84</b>		6. DATE ANALYSIS COMPLETED <b>7 AUG 84</b>	
7. SITE DESCRIPTION						ON-SITE ANALYTICAL RESULTS			
8. SITE LOCATION NO <b>JUL 23 2 04 PM 1984</b>			10. WEATHER <b>0004</b>			12. WATER TEMP <b>00.10 °C</b>		17. PH <b>00400 UNITS</b>	
9. FLOW RATE <b>00058 GAL/MIN</b>			11. COLLECTION DATE/PERIOD			13. SAMPLING TECHNIQUE		14. PHONE NUMBER	
15. REASON FOR SAMPLE SUBMISSION <b>NPDES #</b>						19. RESULTS OF OTHER ON-SITE ANALYSES <b>outlet of left lagoon</b>			
ANALYSES REQUESTED AND RESULTS									
PRESERVATION GROUP A			PRESERVATION GROUP F			PRESERVATION GROUP G			
PARAMETER	TOTAL	MG/L	PARAMETER	DISS	TOTAL	µG/L	PARAMETER	TOTAL	MG/L
Chemical Oxygen Demand	00340	.	ARSENIC	01000	01002	.	BORON	01022	$\frac{1.6}{1}$
Total Organic CARBON as C	00680	.	BARIUM	01005	01007	.	BORON, Dissolved	01020	$\frac{1.6}{1}$
		.	CADMIUM	01025	01027	.	CHLORIDE	00940	.
PRESERVATION GROUP B			CHROMIUM			01030	01034	COLOR	00080 Units
PARAMETER	TOTAL	MG/L	CHROMIUM Hexavalent			01032	FLUORIDE	00951	.
OIL & GREASE FREON-IR Method	00560	.	COPPER			01040	Residue Fil-terable (TDS)	00515	.
PRESERVATION GROUP C			IRON			01046	Residue Non Filtr (SS)	00530	.
PARAMETER	TOTAL	MG/L	LEAD			01049	Residue	00500	.
AMMONIA as N	00610	.	MANGANESE			01056	Residue Volatile	00505	.
NITRATE as N Cd Reduct. Method	00620	.	MERCURY			71890	Specific Conductance	00095	µmhos
NITRITE as N	00615	.	NICKEL			01065	SULFATE as SO <sub>4</sub>	00945	.
TOTAL KJELDAHL NITROGEN as N	00625	.	SELENIUM			01145	SURFACTANTS MBAS as LAS	38260	.
PHOSPHORUS Ortho PO <sub>4</sub> as P	70507	.	SILVER			01075	TURBIDITY	00076	Units
PHOSPHORUS as P	00665	.	ZINC			01090			
PRESERVATION GROUP D			CALCIUM as Ca			00915			
PARAMETER	TOTAL	MG/L	MAGNESIUM as Mg			00925			
CYANIDE	00720	.	POTASSIUM			00935			
CYANIDE Free, Amenable to Cl <sub>2</sub>	00722	.	SODIUM			00930			
PRESERVATION GROUP E			PRESERVATION GROUP I						
PARAMETER	TOTAL	µG/L	PARAMETER						
PHENOLS	32730	16200.							
1. ORGANIZATION REQUESTING ANALYSIS <b>Alouca AFB</b>			CHEMIST <b>dp</b>			REVIEWED BY			
						APPROVED BY <b>Carol B. B. D.</b>			

20 AUG 1984

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2. LABORATORY PERFORMING ANALYSIS <b>O EHL</b>			3. LAB SAMPLE NUMBER <b>40415</b>			1. REQUESTOR SAMPLE NO <b>G N 840294</b> 00029			
4. SAMPLE COLLECTION INFORMATION						10. DATE RECEIVED BY LAB <b>23 Jun 84</b>		5. DATE ANALYSIS COMPLETED <b>7 Aug. 84</b>	
7. DESCRIPTION						11. ON-SITE ANALYTICAL RESULTS			
8. ANALYST'S NAME		9. FLOW RATE AT SITE 00098 PSI/MIN		13. WEATHER		14. WATER TEMP 17. FH 00400 UNITS		18. DISS O <sub>2</sub> 00300 MG/L	
10. COLLECTION DATE/TIME <b>JUL 23 2 04 PM '84</b>				12. COLLECTOR'S NAME		14. RESULTS OF OTHER ON-SITE ANALYSES <b>outlet of left lagoon</b>			
11. SAMPLING TECHNIQUE				14. PHONE NUMBER					
15. REASON FOR SAMPLE SUBMISSION									
NOTES									
ANALYSES REQUESTED AND RESULTS									
PRESERVATION GROUP A			15 PRESERVATION GROUP F (216)				PRESERVATION GROUP G		
PARAMETER	TOTAL	MG/L	PARAMETER	DISS	TOTAL	µG/L	PARAMETER	TOTAL	MG/L
Free Chlorine Oxygen Demand	00340	.	ARSENIC <b>L10</b>	01000	01002	<b>240</b>	BORON	01022	<b>48</b> I
Total Chlorine	00000	.	BARIUM	01005	01007	.	BORON, Dissolved	01020	<b>48</b> I
		.	CADMIUM	01025	01027	<b>35</b>	CHLORIDE	00940	.
PRESERVATION GROUP B			CHROMIUM				COLOR		
PARAMETER	TOTAL	MG/L	01030 01034 <b>347</b>				00080 Units		
OIL & GREASE FREON-IR Method	00560	.	CHROMIUM Hexavalent				FLUORIDE		
		.	01040 01042 <b>57</b>				00951		
PRESERVATION GROUP C			COPPER				Residue Fil-terable (TDS)		
PARAMETER	TOTAL	MG/L	01046 01045 <b>3533</b>				00515		
AMMONIA as N	00610	.	IRON				Residue Non-Filt (SS)		
NITRATE as N Cd Reduct. Method	00620	.	01049 01051 <b>45</b>				00530		
NITRITE as N	00615	.	LEAD				Residue Volatile		
TOTAL KJELDAHL NITROGEN as N	00625	.	01056 01055				00505		
PHOSPHORUS (Phosph) as P	00507	.	MERCURY				Specific Conductance		
PHOSPHORUS as P	00665	.	01890 01900 <b>&lt;1</b>				00095 µmhos		
		.	NICKEL				SULFATE as SO <sub>4</sub>		
		.	01065 01067 <b>81</b>				00945		
		.	SELENIUM				SURFACTANTS MBAS as LAS		
		.	01145 01147				38260		
		.	SILVER				TURBIDITY		
		.	01075 01077 <b>L10</b>				00076 Units		
		.	ZINC						
		.	01090 01092						
PRESERVATION GROUP D			CALCIUM as Ca						
PARAMETER	TOTAL	MG/L	00915 00916 <b>mg</b> <b>1</b>						
VANILE	00720	.	MAGNESIUM as Mg						
		.	00925 00927 <b>mg</b> <b>1</b>						
CYANIDE Free, Ammonide to Cl <sub>2</sub>	00722	.	POTASSIUM						
		.	00935 00937 <b>mg</b> <b>1</b>						
		.	SODIUM						
		.	00930 00929 <b>mg</b> <b>1</b>						
PRESERVATION GROUP E			PRESERVATION GROUP J						
PARAMETER	TOTAL	µG/L	PARAMETER						
FERRICLS	12730	.							
ORGANIZATION REQUESTING ANALYSIS			CHEMIST <b>E.H.W.H. RU</b> <b>198</b>						
Reviewed 11 Sept. 1984 <b>LINDSEY C. WATERHOUSE, Capt., US</b> Chief, Bioenvironmental Engineering 008-36-6670 USAF Hospital Dover			REVIEWED BY <b>D. J. B. Q.</b>						
APPROVED BY			APPROVED BY						

20 AUG 1984

12.03

2. LABORATORY PERFORMING ANALYSIS <b>JCHL</b>			3. LAB AND SAMP NO <b>40416-17</b>			4. REQUESTOR SAMPLE NO <b>GN840295</b> 00029			
5. SAMPLE COLLECTION INFORMATION						6. DATE ANALYSIS COMPLETED <b>7 AUG 84</b>			
7. SITE DESCRIPTION <b>2350024</b>						8. DATE ANALYSIS COMPLETED <b>7 AUG 84</b>			
8. SITE LOCATION NO		9. FLOWRATE AT SITE 00016 GAL/MIN		10. WEATHER		11. DATE ANALYSIS COMPLETED 00401 UNITS		12. DATE ANALYSIS COMPLETED 00305 MG/L	
13. COLLECTION DATE/PERIOD <b>Jul 23 2 04 PM '84</b>				14. COLLECTORS NAME		15. REASON FOR SAMPLE SUBMISSION <b>Inlet end of left lagoon</b>			
16. SAMPLING TECHNIQUE				17. PHONE NUMBER		18. REASON FOR SAMPLE SUBMISSION			
19. REASON FOR SAMPLE SUBMISSION									
20. REASON FOR SAMPLE SUBMISSION									
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99. REASON FOR SAMPLE SUBMISSION									
100. REASON FOR SAMPLE SUBMISSION									

20 AUG 1984

12.03

ANALYST'S PERFORMANCE ANALYSIS		LABORATORY NO.		COLLECTOR SAMPLE NO.	
06HL		40418		GN840296 00020	
SAMPLE COLLECTION INFORMATION				DATE ANALYSIS COMPLETED	
DATE OF COLLECTION				25 JUL 84	
ANALYST'S NAME				DATE ANALYTICAL RESULTS	
J. J. 20418				16. 5155 02	
ANALYST'S ADDRESS				UNITS	
ANALYST'S PHONE				00300 MG/L	
ANALYST'S SIGNATURE				ANALYST'S ANALYSES	
ANALYST'S DATE				Subs. left laggon.	

PRESERVATION GROUP A			PRESERVATION GROUP E			PRESERVATION GROUP G		
PARAMETER	TOTAL	MG/L	PARAMETER	TOTAL	MG/L	PARAMETER	TOTAL	MG/L
AMMONIA as N	0015	.	ARSENIC	100	100	BORON	01022	48 1
NITRATE as N 1.2 Reduction Method	0020	.	BARIUM	1005	1005	BORON, Dissolved	01020	48 1
NITRITE as N	0015	.	CALCIUM	0028	0027	CHLORIDE	00940	.
TOTAL KJELDAHL NITROGEN as N	0025	.	COPPER	100	100	COLOR	00080	Units
CHLORIDE	0000	.	IRON	01040	01045	FLUORIDE	00951	.
SULFATE as SO <sub>4</sub>	0000	.	LEAD	01049	01051	Residue Fil- trable (FDS)	00515	.
AMMONIA as N	0015	.	MANGANESE	01056	01055	Residue Non Filtrable (SS)	00530	.
NITRATE as N	0020	.	MERCURY	01060	01060	Residue	00500	.
NITRITE as N	0015	.	NICKEL	01065	01065	Residue Volatile	00505	.
TOTAL KJELDAHL NITROGEN as N	0025	.	SILICON	01145	0114	Specific Conductance	00095	µmhos
CHLORIDE	0000	.	SILVER	01075	01077	SULFATE as SO <sub>4</sub>	00945	.
SULFATE as SO <sub>4</sub>	0000	.	ZINC	01090	0109	SURFACTANTS MEAS as LAS	38260	.
AMMONIA as N	0015	.	CALCIUM as Ca	00915	00910	TURBIDITY	00076	Units
NITRATE as N	0020	.	MAGNESIUM as Mg	00925	00927			
NITRITE as N	0015	.	POTASSIUM	00945	00937			
TOTAL KJELDAHL NITROGEN as N	0025	.	SODIUM	00930	00929			
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.						
AMMONIA as N	0015	.						
NITRATE as N	0020	.						
NITRITE as N	0015	.						
TOTAL KJELDAHL NITROGEN as N	0025	.						
CHLORIDE	0000	.						
SULFATE as SO <sub>4</sub>	0000	.			</			



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## NON-POTABLE WATER ANALYSIS

2000 1984 12.03

LABORATORY PERFORMING ANALYSIS			REQUESTOR SAMPLE NO		
OEH			40420-23		
SAMPLE COLLECTION INFORMATION			DATE ANALYSIS COMPLETED		
SITE DESCRIPTION			2350 24 7 Aug 84		
8. SITE LOCATION NO		9. SITE NAME		10. SITE ANALYTICAL RESULTS	
				18. DISS O <sub>2</sub> 00300 MG/L	
11. COLLECTION DATE		12. COLLECTION TIME		13. SITE ANALYSES	
JUL 23 2 04 PM '84				<i>collected to left laguna up drainage ditch</i>	
14. REASON FOR SAMPLE SUBMISSION					
ANALYSIS REQUESTED AND RESULTS					
PRESERVATION GROUP A		PRESERVATION GROUP F		PRESERVATION GROUP G	
PARAMETER	TOTAL	PARAMETER	TOTAL	PARAMETER	TOTAL
ARSENIC	00343 15	ARSENIC	01012 410	BORON	01022 48
BARIUM	00580	BARIUM	01007	BORON, Dissolved	01020 48
CADMIUM	01025 01027 45	CADMIUM	01034 107	CHLORIDE	00940
CHROMIUM	01030 01034 107	CHROMIUM Hexavalent	01032 450	COLOR	00080 Units
COPPER	01040 01042 56	COPPER	01040 01042 56	FLUORIDE	00951
IRON	01046 01045 3607	IRON	01046 01045 3607	Residue Filtrate (TDS)	00515
LEAD	01049 01051 426	LEAD	01049 01051 426	Residue Non Filtrate	00530
MANGANESE	01056 01055	MANGANESE	01056 01055	Residue	00500
MERCURY	01060 01060 41	MERCURY	01060 01060 41	Residue Volatile	00505
NICKEL	01065 01067 450	NICKEL	01065 01067 450	Specific Conductance	00095 $\mu$ mhos
SELENIUM	01145 01142	SELENIUM	01145 01142	SULFATE as SO <sub>4</sub>	00945
SILVER	01070 01072 410	SILVER	01070 01072 410	SURFACTANTS MBAS as LAS	38260
ZINC	01090 01092	ZINC	01090 01092	TURBIDITY	00076 Units
CALCIUM as Ca	00915 00916 1	CALCIUM as Ca	00915 00916 1		
MAGNESIUM as Mg	00925 00927 1	MAGNESIUM as Mg	00925 00927 1		
POTASSIUM	00935 00937 1	POTASSIUM	00935 00937 1		
SODIUM	00939 00939 1	SODIUM	00939 00939 1		
PRESERVATION GROUP E		PRESERVATION GROUP F		PRESERVATION GROUP J	
PARAMETER	TOTAL	PARAMETER	TOTAL	PARAMETER	TOTAL
PHENOLS	01270 17200 48	PHENOLS	01270 17200 48		
ORGANIZATION REQUESTING ANALYSIS					
Approved 11/17/84 Approved 1/17/85				CHEMIST E.H. 11/17/84 REVIEWED BY [Signature] APPROVED BY [Signature]	
LINDSEY C. [Signature] Chief, Bldg 008-36-8670 Hospital Dover				008-36-8670 Hospital Dover	

APPENDIX I: Correspondance With  
Regulatory Authorities



STATE OF DELAWARE  
DEPARTMENT OF NATURAL RESOURCES  
& ENVIRONMENTAL CONTROL  
DIVISION OF ENVIRONMENTAL CONTROL  
WATER RESOURCES SECTION  
89 KINGS HIGHWAY  
P.O. Box 1401  
DOVER, DELAWARE 19903

TELEPHONE (302) 736-4761

February 28, 1984

Mr. Thomas D. Sims, Chief  
Environmental Planning Division  
Department of the Air Force  
526 Title Building  
30 Pryor Street, S.W.  
Atlanta, Georgia 30303

Dear Mr. Sims:

The Delaware Department of Natural Resources and Environmental Control (DNREC) has reviewed the Installation Restoration Program Phase I, Records Search Report for Dover Air Force Base, Delaware. Based on the recommendations proposed by Engineering Science, we offer the following comments for your consideration.

Hydrogeologic work must be performed under the supervision of a geologist registered in Delaware. Hydrogeologic reports must bear the signature and seal of a registered geologist.

Monitoring wells must have approval in the form of permits from the Department prior to construction. Wells must be installed by water well contractors licensed by the Department, confirm with Department regulations (including any special guidelines or conditions), and be designed for compatibility with determination of hydrogeologic conditions (aquifer characteristics and ground water flow patterns). Guidelines for water table monitor wells are attached.

Geophysical investigations (electrical resistivity and magnetometer surveys) may be useful, especially the former in defining characteristics and thickness of the Columbia sediments. However, these methods are unlikely to be of use in delineating contaminant plumes which do not have electrical properties significantly different from that of the natural ground water. Therefore, use of these geophysical methods to determine whether additional work is needed is not advisable.

Monitor wells should be located downgradient of each major source of contamination. Test borings at each site should be extended to the base of the Columbia Formation to determine the presence and thickness of the confining bed above the Frederica Aquifer.

At least one upgradient well and three downgradient wells should be installed at the IW-basin site. In addition, we request at least quarterly sampling of wells

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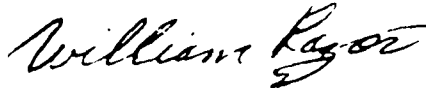
Colonel Thomas D. Sims  
Department of the Air Force  
February 28, 1984  
Page 2

for parameters presented in Table 6.2(b). Performance of a complete hydrogeologic study of the site, as required by 40 CFR 264.91(c), is requested. If remedial action is warranted, a corrective action program which includes, but is not limited to, requirements listed in 40 CFR 264.100 should be developed.

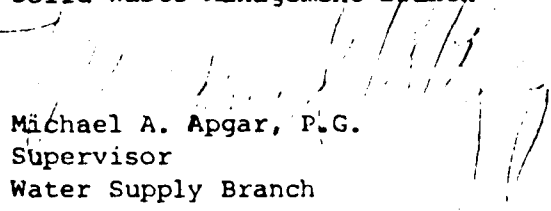
Assessment of the need for future investigations and any remedial work should depend on the potential impact upon current and/or future sources of water supply and on the existing potential of adverse impacts on the environment. A meeting with Dover Air Force Base representatives, consultants, and DNREC to discuss these comments, particularly the consultants' reaction and proposed investigative approach is recommended.

Questions related to RCRA concerns may be directed to Ms. Eileen Hack (302-736-3685); CERCLA questions to Mr. Robert Pickert (302-736-5063).

Sincerely,



William G. Razor  
Supervisor/Environmental Engineer  
Solid Waste Management Branch



Michael A. Apgar, P.G.  
Supervisor  
Water Supply Branch

WGR:MAA:lmw

Attachment

cc: Alan H. Simpson  
Eileen M. Hack  
Robert C. Pickert

Government Copier, Dover AFB #16

AND ENVIRONMENTAL CONTR'  
DIVISION OF ENVIRONMENTAL CONTROL  
WATER SUPPLY BRANCH

GENERAL GUIDELINES FOR CONSTRUCTION OF MONITOR WELLS

1. Monitor wells must be constructed by a method which will define the characteristics of the geologic materials under the site. The properties of the earth materials penetrated by the wells must be described.
2. Monitor wells close to the waste sources, unless otherwise approved by DNREC based on the ground-water flow system, are to be screened from the seasonal high water table level to five feet below the seasonal low water level.
3. The screen slots must be small enough to allow turbidity - free water to be withdrawn from the well, and should be machine slotted or manufactured screens rather than pipe with hack sawed slots. Each well must be developed after construction so that the well will yield at least 1 gallon of turbidity - free water per minute.
4. The annular space of the screened interval must be gravel packed.
5. If the water level will never be deeper than 15 feet below the ground surface, a 2-inch I.D. casing can be used with a centrifugal pump. If the water level may at times be 15 feet below the ground surface, the casing must be at least 4 inches in diameter to accomodate a submersible pump.
6. Either PVC or steel casing is acceptable as long as at least schedule 40 pipe is utilized.
7. The annular space around each casing must be sealed with cement or bentonite from the ground surface to 2 feet above the screen to prevent vertical leakage along the well casing.
8. The casing should be protected from entry of contaminants, vandalism, or accidental damage by machinery by constructing the cap above grade and, if PVC casing is used, using a protective concentric steel casing around the above-ground portion with a locking top.
9. The elevations of the tops of the well casings, without the caps, must be measured to determine the direction of groundwater flow.
10. Permits to construct the monitoring wells must be obtained from the Water Supply Branch of the DNREC, prior to construction.

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11 . Well must be drilled by a licensend Well Contractor.

Permitting Copies, COVER AFB #10



STATE OF DELAWARE  
DEPARTMENT OF NATURAL RESOURCES  
& ENVIRONMENTAL CONTROL  
DIVISION OF ENVIRONMENTAL CONTROL  
WATER RESOURCES SECTION  
89 KINGS HIGHWAY  
P.O. BOX 1401  
DOVER, DELAWARE 19903

TELEPHONE (302) 736-4761

MEMORANDUM

TO: Mr. Kevin Burdette

FROM: Philip J. Cherry *PJC*

DATE: October 22, 1984

-----

The Department herein waives the policy requirement requiring gravel packing of monitor wells for the following wells located on Dover Air Force property. The wells are designated (DNREC permit #'s #58895, #58918 thru #58931, and 1 ~~through~~ <sup>47</sup> #58934 thru #58945). Said wells must still meet all other requirements as set forth in "General Guidelines for Construction of Monitor Wells" (copy attached).

PJC/

DELAWARE DEPARTMENT OF NATURAL RESOURCES

AND ENVIRONMENTAL CONTROL

DIVISION OF ENVIRONMENTAL CONTROL

WATER SUPPLY BRANCH

GENERAL GUIDELINES FOR CONSTRUCTION OF MONITOR WELLS

1. Monitor well must be constructed by a method which will define the characteristics of the geologic materials under the site. The properties of the earth materials penetrated by the wells must be described.
2. Monitor wells close to the waste sources, unless otherwise approved by DNREC based on the ground-water flow system, are to be screened from the seasonal high water table level to five feet below the seasonal low water level.
3. The screen slots must be small enough to allow turbidity - free water to be withdrawn from the well, and should be machine slotted or manufactured screens rather than pipe with hack sawed slots. Each well must be developed after construction so that the well will yield at least 1 gallon of turbidity - free water per minute.
4. The annular space of the screened interval must be gravel packed.
5. The water level will never be deeper than 15 feet below the ground surface, a 2-inch I.D. casing can be used with a centrifugal pump. If the water level may at times be 15 feet below the ground surface, the casing must be at least 4 inches in diameter to accommodate a submersible pump.
6. Either PVC or steel casing is acceptable as long as at least schedule 40 pipe is utilized.
7. The annular space around each casing must be sealed with cement or bentonite from the ground surface to 2 feet above the screen to prevent vertical leakage along the well casing.
8. The casing should be protected from entry of contaminants, vandalism, or accidental damage by machinery by constructing the cap above grade and, if PVC casing is used, using a protective concentric steel casing around the above-ground portion with a locking top.
9. The elevations of the tops of the well casings, without the caps, must be measured to determine the direction of groundwater flow.
10. Permits to construct the monitoring wells must be obtained from the Water Supply Branch of the DNREC, prior to construction.



APPENDIX J: Dover Air Force Base  
Waste Management Summary Tables

Table J-1

Summary of Waste Material and Time Period of No Known Method of Disposal  
(From IRP Phase IIa report, JRB, June 1984)

Shop Name	Waste and Quantity	Period of		Earliest Known Method of Disposal
		Unknown Method		
436 AMS <sup>1</sup> Electric Shop	PB-680; 10 gals/mo. batteries (acid); 15 batt./mo.	1942-1955	1955-1965, fire training/landfill	
436 AMS Battery Shop	batteries (acid); 100 batt./mo	1942-1955	1955-1984, neutralized	
436 CES <sup>2</sup> Paint Shop	paints, MEK <sup>3</sup> , toluene, thinner minneral spirits; 25 gals/mo.	1942-1951	1951-1984, drums- contractor	
436 FMS <sup>4</sup> - Aero Ground Equipment Branch	waste lube oil; 110 gals/mo. hydraulic fluid; 23 gals/mo	1942-1951 1942-1951	1951-1975, fire training 1951-1965, landfill/fire training	
	synthetic oil; 8 gals/mo mixed wastes (PD-680, waste oils, hydraulic fluid); 41 gals/mo	1942-1951 1942-1951	1951-1975, fire training 1951-1965, fire training	
	hydraulic fluid; 165 gals/mo (pro-tem 1100 gals/mo.)	1942-1946	1951-1965, fire training	
	PB-680; 110 gals/mo	1942-1946	1951-1965, fire training	
436 FMS Wheel and Tire Shop	PB-680; 18 gals/mo hydraulic fluid; 18 gals/mo	1942-1946	1951-1965, fire training	
436 FMS Aero Repair	trichloroethane; 27 gals/yr acids; 50 gals/yr, cadmium cyanide crystals, 55 gals/2 yrs.	1942-1946	1951-1963, North Ditch	

(1) AMS - Avionics Maintenance Squadron

(2) CES - Civil Engineering Squadron

(3) MFE - Methyl Ethyl Ketone

(4) FMS - Field Maintenance Squadron

Table J-1  
Summary of Waste Material and Time Period of No Known Method of Disposal  
(Continued)

[illegible]

Table J-2  
(From IRP Phase I report, ES, October 1983)

# **INDUSTRIAL OPERATIONS (Shops)** Waste Management

1 of 6

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY	TREATMENT, STORAGE & DISPOSAL 1950 1960 1970 1980	METHOD(S) OF
<b>436th AIR BASE GROUP (ABG)</b> AUTO HOBBY SHOP  PHOTOGRAPHY HOBBY SHOP	124	WASTE OIL	320 GAL./MO.		DPDO UNDERGROUND 197 198 TANK/CONTRACTOR 197 CONTRACTOR SILVER RECOVERY AT BASE PHOTO LAB 198
	124	WASTE LACQUER SOLVENT	15 GAL./MO.		
		SPENT PHOTO FIXER	5 GAL./6 MOS.		
<b>436th AVIONICS MAINTENANCE SQUADRON (AMS)</b> AMS ELECTRIC SHOP  AMS BATTERY SHOP	722	PD 680	10 GAL./MO.	1962 1966	BORSEY LANDFILL OR FIRE TRAINING 1951
		BATTERIES (ACID)	15 BATT./MO.	1962 1966	NEUTRALIZED INTO DRY SINK/STORM DRAIN 1951
	711	BATTERIES (ACID)	100 BATT./MO.	1962 1966	NEUTRALIZED /SANITARY SEWER 1951
<b>436th CIVIL ENGINEERING SQUADRON</b> ROADS AND GROUNDS  ENTOMOLOGY	914	DEGREASER (SD 5)	ESTIMATE UNAVAILABLE		WASH RACK OIL/WATER SEPARATOR 1951 NORTH DITCH INDUSTRIAL WASTE COLLECTION SYSTEM BLDG. 182
	921	PESTICIDE DRUMS	ESTIMATE UNAVAILABLE		1951 ON BASE LANDFILLS TRIPLE RINSED DPDO
	601, 914	EMPTY PESTICIDE CONTAINER (SMALL)	10 20/MO.		1951 ON BASE LANDFILLS RINSED DUMPSITE

KEY  
----- CONFIRMED TIME FRAME DATA BY SHOP PERSONNEL  
----- ESTIMATED TIME FRAME DATA BY SHOP PERSONNEL

## Waste Management

**KEY**

UNCONFIRMED TIME FRAME. DATA BY SHOP PERSONNEL

-----ESTIMATED TIME FRAME DATA BY SHOP PERSONNEL

## INDUSTRIAL OPERATIONS (Shops)

## Waste Management

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL 1950 1960 1970 1980
436th FIELD MAINTENANCE SQUADRON (cont'd)				
AIRCRAFT ENVIRONMENTAL SYSTEMS	714	WASTE OIL TRICHLOROETHYLENE, PD-680	2 QTS./WK.  ESTIMATE UNAVAILABLE	1951 FIRE TRAINING LANDFILL OR FIRE TRAINING BASIN TANK DRUMS (DPDO)
PNEUMATICS SHOP	712	HYDRAULIC FLUID	165 GALS./MO. (PRO TEM 1100 GALS./MO.)	
		PD 680	18 GALS./MO.	
WHEEL AND TIRE SHOP	712	PD 680	110 GALS./MO.	1982 1986 LANDFILL OR FIRE TRAINING BASIN TANK DRUMS (DPDO)
AERO REPAIR	714	PD 680 HYDRAULIC FLUID	18 GALS./MO. 18 GALS./MO.	
FUEL SYSTEMS REPAIR	995, 715, FLIGHTLINE	JP 4	630 GALS./MO.	1951 FIRE TRAINING BOWSER UNDERGROUND TANK AT "B" ROW SILVER RECOVERY TO SANITARY SEWER SANITARY SEWER LANDFILL OR FIRE TRAINING DRUMS (LALDON TANK) DRUMS (DPDO) OR FIRE TRAINING
NON DESTRUCTIVE INSPECTION	714	SPENT PHOTO FIXER ISOPAR	85 GALS./MO. 5 GALS. MO.	1951 1951
MACHINE SHOP	724	WASTE OILS	15 GALS./YR.	1951 1951
METAL PLATING AND WELDING	724	TRICHLOROETHANE ACIDS CADMIUM CYANIDE CRYSTALS	27 GALS. YR. 50 GALS. YR. 55 GALS./2 YRS.	1982 1986 1982 1986 1982 1986 NORTH DITCH NORTH DITCH NORTH DITCH INDUSTRIAL WASTE COLLECTION SYSTEM NEUTRALIZED WITH SPENT ELECTROCLEANER INDUSTRIAL WASTE COLLECTION SYSTEM DRUMMED/CONTRACTOR

KEY

- (CONFIRMED) TIME FRAME DATA BY SHOP PERSONNEL

-----ESTIMATED TIME FRAME DATA BY SHOP PERSONNEL



Table J-2

# INDUSTRIAL OPERATIONS (Shops)

## Waste Management

5 of 6

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL 1950 1960 1970 1980
436th FIELD MAINTENANCE SQUADRON (cont'd)  JET ENGINE INSPECTION/ MAINTENANCE SHOPS (cont'd)	725, 719	TRICHLOROETHANE (TCA)	73 GALS./MO.	1942 1944 1941 NORTH DITCH 1941 INDUSTRIAL WASTE COLLECTION SYSTEM CONTRACTOR
		WHEEL STRIPPER	80 GALS./MO.	1942 1944 1941 NORTH DITCH 1941 INDUSTRIAL WASTE COLLECTION SYSTEM
		ACETONE	4 GALS./MO.	1942 1944 1941 NORTH DITCH 1941 INDUSTRIAL WASTE COLLECTION SYSTEM
		CALIBRATING FLUID	10 GALS./MO.	1942 1944 1941 NORTH DITCH 1941 DRUMS/GUARD BASINS
		JP 4	27 GALS./MO.	1942 1944 1941 NORTH DITCH 1941 INDUSTRIAL WASTE COLLECTION SYSTEM DRUMS/DPDO
DENTAL CLINIC AND LAB  MEDICAL X RAY	304  300	SPENT PHOTO FIXER	5 GALS./MO.	1942 1944 1941 NORTH DITCH 1941 INDUSTRIAL WASTE COLLECTION SYSTEM
		SPENT PHOTO FIXER	160 GALS./MO.	1942 1944 1941 NORTH DITCH 1941 INDUSTRIAL WASTE COLLECTION SYSTEM
FLIGHTLINE BRANCH	704	WASTE OIL	27 GALS./MO.	1942 1944 1941 NORTH DITCH 1941 INDUSTRIAL WASTE COLLECTION SYSTEM
		HYDRAULIC FLUID	2400 GALS./MO.	1942 1944 1941 NORTH DITCH 1941 INDUSTRIAL WASTE COLLECTION SYSTEM
TRANSIENT MAINTENANCE	576	JP 4	10 GALS./MO.	1942 1944 1941 NORTH DITCH 1941 INDUSTRIAL WASTE COLLECTION SYSTEM

## KEY

----- CONFIRMED TIME FRAME DATA BY SHOP PERSONNEL

----- ESTIMATED TIME FRAME DATA BY SHOP PERSONNEL



Table J-2

a

# INDUSTRIAL OPERATIONS (Shops)

## Waste Management

6 of 6

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL 1950 1960 1970 1980
436th TRANSPORTATION SQUADRON	635, 780, 781	WASTE OIL	110 GALS. /MO.	1951 1966 1980 FIRE TRAINING DRUMS DPOO
		BATTERY ACID	60 GALS. /MO.	1962 1966 NEUTRALIZED TO SANITARY SEWER
		WASTE OIL, HYDRAULIC FLUID	30 GALS. /MO.	1962 1966 LANDFILL OR FIRE TRAINING BODSER BASIN TANK
REFUELLING, VEHICLE MAINTENANCE	636	WASTE OIL	25 GALS. /MO.	1962 1966 FIRE TRAINING INDUSTRIAL WASTE COLLECTION SYSTEM
		JP 4	50 GALS. /MO.	
		PD 680	9 GALS. /MO.	
		DIESEL FUEL	< 2 GALS. /MO.	
		MOGAS	< 2 GALS. /MO.	

KEY

----- (CONFIRMED TIME FRAME DATA BY SHOP PERSONNEL)

----- (ESTIMATED TIME FRAME DATA BY SHOP PERSONNEL)

APPENDIX K: CALCULATIONS



## Worksheet

Hydrogeologic Calculations

Subject

Site T-1, IW Basins

Page

Date

Client

Dover AFB, Phase II Stage I

Project No.

Prepared By

Checked By

Hydraulic conductivity (K) = 90 ft/day

Effective porosity (n) = 0.20

Hydraulic gradient (i) = 0.0016

Distance to Base Boundary (d) = 1300 ft

### 1. Calculation of Groundwater Flow Velocity

$$\text{Velocity (v)} = Ki/n$$

$$v = \frac{(90 \text{ ft/day})(0.0016)}{(0.20)}$$

$$v = 0.72 \text{ ft/day}$$

### 2. Calculation of Travel Time to Base Boundary

$$\text{Travel time} = d/v$$

$$= \frac{1300 \text{ ft}}{0.72 \text{ ft/day}}$$

$$= 1805 \text{ days (4.9 years)}$$



# Worksheet

## Hydrogeologic Calculations

Subject

Sites D-10 and FT-1

Page

Date

Client

Dover AFB, Phase II Stage 1

Project No.

Prepared By

Checked By

Hydraulic conductivity (K) = 90 ft/day  
Effective porosity (n) = 0.20  
Hydraulic gradient (i) = 0.0024  
Distance to Base Boundary (d) = 4099.7 ft

### 1. Calculation of Groundwater Flow Velocity

$$\text{Velocity (v)} = Ki/n$$

$$v = \frac{(90 \text{ ft/day}) (0.0024)}{0.20}$$

$$v = 1.08 \text{ ft/day}$$

### 2. Calculation of Travel Time to Base Boundary

$$\text{Travel Time} = d/v$$

$$\text{Travel time} = \frac{4099.7 \text{ ft}}{1.08 \text{ ft/day}}$$

$$\text{travel time} = 3796 \text{ days (104 yrs.)}$$



Worksheet  
Hydrogeologic Calculations

Page

Date

Subject

Site FT-3

Client

Dover AFB, Phase II Stage 1

Project No.

Prepared By

Checked By

Hydraulic Conductivity (K) = 90 ft/day  
Effective porosity (n) = 0.20  
Hydraulic gradient (i) = 0.0014  
Distance to Base Boundary (d) = 1402.7 ft

1. Calculation of Groundwater Flow Velocity

$$\text{Velocity (v)} = Ki/n$$

$$v = \frac{(90 \text{ ft/day})(0.0014)}{0.20}$$

$$v = 0.63 \text{ ft/day}$$

2. Calculation of Travel Time to Base Boundary

$$\text{Travel Time} = d/v$$

$$\text{Travel time} = \frac{1402.7 \text{ ft}}{0.63 \text{ ft/day}}$$

$$\text{Travel time} = 2226.5 \text{ days (6.1 years)}$$



# Worksheet

## Hydrogeologic Calculations

Page

Date

Subject

Site S-1

Client

Dover AFB, Phase II, Stage 1

Project No.

Prepared By

Checked By

Hydraulic conductivity ( $K$ ) = 90 ft/day  
Effective porosity ( $n$ ) = 0.20  
Hydraulic gradient ( $i$ ) = 0.0009  
Distance to Base Boundary ( $d$ ) = 2813.4 ft

### 1. Calculation of Groundwater Flow Velocity

$$\text{Velocity } (v) = Ki/n$$

$$v = \frac{(90 \text{ ft/day})(0.0009)}{0.20}$$

$$v = 0.41 \text{ ft/day}$$

### 2. Calculation of Travel Time to Base Boundary

$$\text{Travel Time} = d/v$$

$$\text{Travel time} = \frac{2813.4 \text{ ft}}{0.41 \text{ ft/day}}$$

$$\text{Travel time} = 6862 \text{ days (18.8 years)}$$



# Worksheet

## Hydrogeologic Calculations

Page

Date

Subject

Site XYZ

Client

Dover AFB, Phase II, Stage 1

Project No.

Prepared By

Checked By

Hydraulic Conductivity ( $K$ ) = 90 ft/day  
Effective Porosity ( $n$ ) = 0.20  
Hydraulic gradient ( $i$ ) = 0.0045  
Distance to Base Boundary ( $d$ ) = 2623.8 ft

### 1. Calculation of Groundwater Flow Velocity

$$\text{Velocity } (v) = Ki/n$$

$$v = \frac{(90 \text{ ft/day})(0.0045)}{0.20}$$

$$v = 2.025 \text{ ft/day}$$

### 2. Calculation of Travel Time to Base Boundary

$$\text{Travel Time} = d/v$$

$$\text{Travel time} = \frac{2623.8 \text{ ft}}{2.025 \text{ ft/day}}$$

$$\text{Travel time} = 1296 \text{ days (3.55 years)}$$

APPENDIX L: Resumes



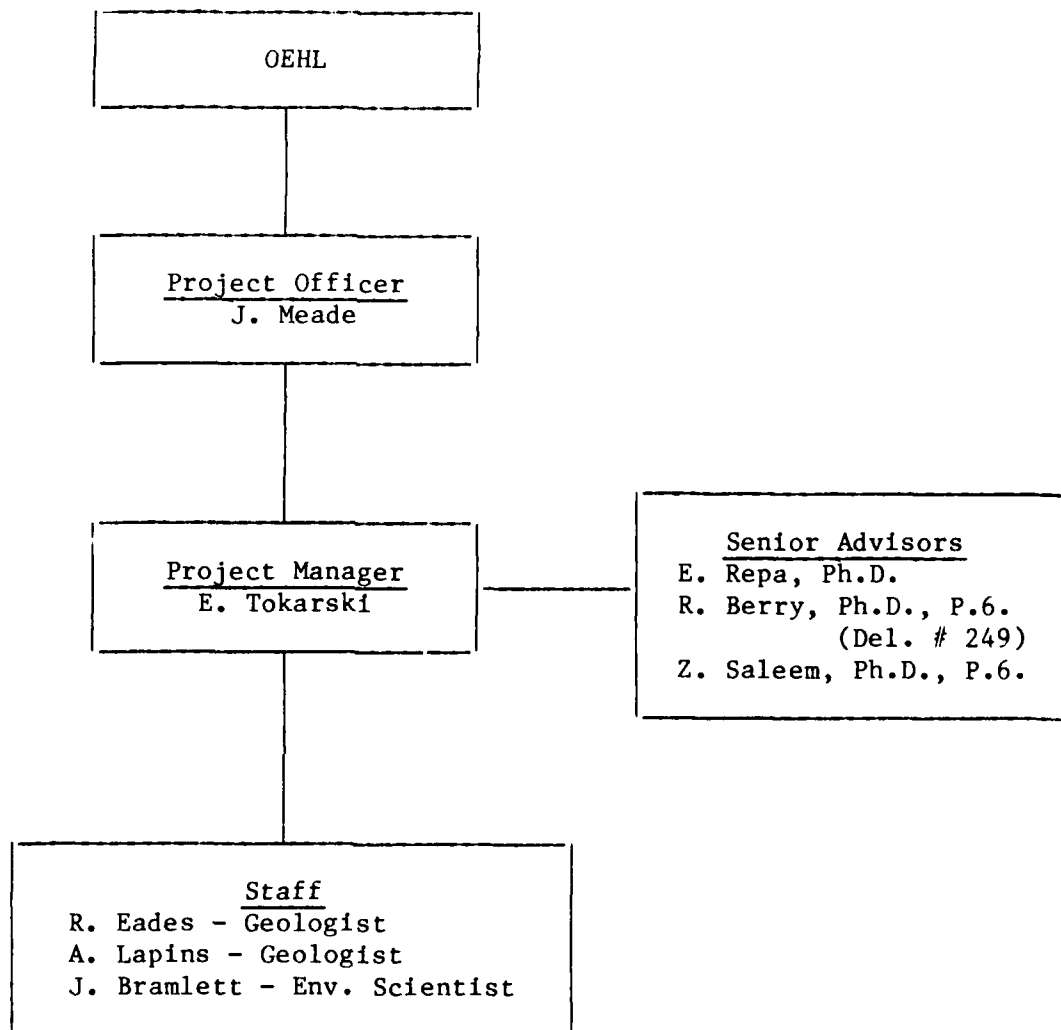


Figure K-1

Project Management Structure - Dover AFB Phase II Stage 1 Study

JENNIFER A. BRAMLETT

### EDUCATION

University of Maryland: B.S., Natural Resource Management (1979)

### EXPERIENCE

Ms. Bramlett is an environmental scientist with over five years of experience in the field of solid and hazardous waste management. She has worked within waste regulatory programs under both RCRA and CERCLA, for both the U.S. EPA and the Department of Defense (DOD) and for state and local governments.

Ms. Bramlett is currently providing technical input for a Phase II, Stage 1 effort under the Air Force's Installation Restoration Program (IRP). The Phase II, Stage 1 effort involves the comprehensive confirmation and characterization of contaminant migration at hazardous waste sites on DOD installations. She was also the Task Manager during a Phase I effort, or installation assessment, of a government-owned, contractor-operated (GOCO) facility in Tucson, Arizona, under the Air Force's IRP. Phase I of the IRP involves a site visit and documentation of past and present industrial operations, past and present waste management practices, and the environmental setting. Identified waste sites are ranked based on their relative potentials for environmental impact and recommendations are made for Phase II. Other Phases of the IRP, including remedial action planning, were ongoing at this particular facility because of confirmed groundwater contamination problems. Therefore, this Phase I also included the documentation of these activities. Ms. Bramlett was also a primary technical contributor during a Phase I effort at a GOCO facility in San Diego, CA.

Ms. Bramlett was a Team Leader during a preliminary assessment for the DOD of waste resource conservation and recovery opportunities at eleven GOCO facilities. Besides overseeing the non-industrial waste study area of the project for all eleven facilities, Ms. Bramlett also worked on a more in-depth waste recovery feasibility analysis for one selected GOCO facility.

Ms. Bramlett was co-project manager of a project for the USEPA in which data was gathered on the composition of leachate from hazardous waste sites located throughout the United States. The data was used to assess the feasibility of formulating a synthetic leachate to test liner compatibility. Ms. Bramlett was also a member of a sampling team which visited various sites and sampled leachate for laboratory and field analysis.

Ms. Bramlett was a member of the field team conducting groundwater sampling at the LiPari Landfill in New Jersey, Superfund Site No. 1. Sample analyses results were used to assess the performance of implemented remedial actions.

Verified for accuracy by:

*Jennifer A. Bramlett*

Date:

*4/27/86*

**SAIC**

JENNIFER A. BRAMLETT

Page 2 of 2

Ms. Bramlett's other field experience includes air sampling for asbestos in post offices in rural communities in western Pennsylvania and acting as a Document Control Officer during the geotechnical assessment of the hazardous waste disposal site Love Canal in New York. During the latter, she was responsible for ensuring adherence in the field to the project's Quality Assurance/Quality Control and Health and Safety plans. She additionally assisted in on-site hydrological testing conducted to characterize groundwater flow.

Under a project for EPA's Waste Identification Branch, Ms. Bramlett is evaluating petitions from generators to exclude a waste listed under 40 CFR Part 261, Subpart D. She is evaluating the delisting petitions for completeness and technical adequacy, making decisions of denial or acceptance, and preparing Federal Register Notices announcing proposed exclusions. Ms. Bramlett also contributed to a guidance manual for petition preparation.

Ms. Bramlett has also provided technical review, synopsis, and computer coding of public comments for the U.S. EPA regarding the Organic Chemicals and Plastics and Synthetic Fibers (OCPSF) Point Source Category Effluent Limitations proposed rule.

Ms. Bramlett was active in a multi-year Industry Studies Program for EPA's Office of Solid Waste. The program was an in-depth waste management assessment of chemical classes within several industrial segments. Ms. Bramlett participated in the waste management assessments of the chlorinated and brominated organics and carbamate industrial segments.

Ms. Bramlett was active in the U.S. EPA Technical Assistance Panels Programs for Regions III, V, and EPA Headquarters. The Programs provided assistance to state and local governments in both solid and hazardous waste management. For various technical assistance recipients, Ms. Bramlett assessed waste management options, evaluated waste management programs, and analyzed the feasibility of waste-to-energy recovery.

#### PUBLICATIONS

Bramlett, J., E. Repa, C. Furman. Installation Restoration Program Phase I - Records Search, Air Force Plant 44, Tucson, Arizona. Prepared for: Wright-Patterson AFB, Ohio; October 1985.

Burger, B., J. Bramlett, K. Boyer, C. Furman. Installation Restoration Program Phase I - Records Search, Air Force Plant 19, San Diego, California. Prepared for: Wright-Patterson AFB, Ohio; September 1984.

JRB Associates. Solid Waste Data - A Compilation of Statistics on Solid Waste Management within the United States. Prepared for: U.S. Environmental Agency, Office of Solid Waste and Emergency Response. EPA contract no.: 68-01-6000. August 1981.

Verified for accuracy by:

*Jennifer A. Bramlett*

Date:

*4/23/86*

**SAIC**

RICHARD H. BERRY  
5203 Richardson Drive  
Fairfax, Virginia 22032  
Tel. (703) 323-5211

#### BACKGROUND SUMMARY

More than 25 years of experience in applying geology and geophysics to the assessment of engineering problems, mineral deposits, and groundwater conditions. Projects have involved 37 U.S. states and eight foreign countries, comprising an extensive range of geologic environments.

#### EDUCATION

PhD, Geology, Yale University, 1961  
MS, Geology, Yale University, 1957  
BA, Geology, Williams College, 1955  
Graduate courses in Geophysics and Mathematics, George Washington University, 1969-1971

#### EXPERIENCE

##### Independent Consulting Geologist, 1979-Present

Performs a wide variety of domestic and foreign assignments, mainly for mining and engineering consulting firms. Principal efforts have involved:

- Stability of mines, tunnels and other underground structures.
- Foundation conditions and earthquake hazards.
- Coal and industrial mineral deposits.
- Groundwater conditions associated with commercial and domestic water supply, waste disposal, construction, and structural damage.
- Expert legal testimony.

##### Senior Geologist, Dames & Moore, Consulting Engineers, Washington, D.C., 1973-1979.

Directed geological and geophysical investigations for heavy construction projects, including:

- Foundation and construction conditions for dams, pipelines, open pit mines, fuel storage facilities and other major structures.
- Geological and geophysical studies for 12 nuclear power plants in the U.S. and abroad, including detailed fault studies and earthquake assessments.
- Stability of tunnels, mines, and other deep rock excavations.
- Site selection and environmental assessment of conventional and nuclear waste disposal sites.

Senior Scientist, Computer Sciences Corporation, Falls Church, VA, 1968-1973.

Performed varied research and consultant functions involving geology and geophysics. Major projects included:

- Comprehensive assessment of construction, environmental impact, and electrical ground conductivity of seven alternative U.S. sites for a major military communications system involving surface and deep underground emplacement of hundreds of miles of antenna cable (1971-1973).
- Analysis of costs and performance rates of drilling, blasting, and excavating techniques for computer simulations of quarry and underground coal mine operations.

Assistant Director of Operations, Environmental Research Corporation, Alexandria, VA, 1965-1968.

Assisted in managing 15-20 geologists, geophysicists and engineers employed in research of seismic ground motion and other effects of nuclear and conventional explosives. Typical projects included:

- Prediction of blast effects of nuclear testing at the Nevada Test Site.
- Design and implementation of seismic monitoring programs for construction and quarry blasting.

Chief Geologist, Roland F. Beers, Inc., Alexandria, VA, 1962-1965.

Directed geology staff in compiling and assessing geologic, geophysical and hydrologic information associated with proposed nuclear blast sites. Efforts included:

- Preparation of detailed plans and cost estimates adopted by the U.S. Corps of Engineers for a major exploration program to precede proposed nuclear excavation of a canal across Central America.
- Inspection and evaluation of potential slope and dam failures associated with nuclear blasts in Colorado, New Mexico, Nevada, and Mississippi.

Geologist, Brown and Root, Inc., Houston, Texas, 1959-1962.

Inspected and evaluated geology, hydrology, and other construction aspects of tunnels, dams, pipelines, and missile silos; identified concrete aggregate sources and prepared cost estimates for constructing underground structures. In 1959-1960 assessed daily excavation conditions in the 26-mile Roberts Tunnel, Colorado.

Field Geologist, New York State Geological Survey, Albany, NY, 1956-1958.

Mapped a portion of the eastern Adirondack Mountains, interpreted structure and metamorphic derivation of plutons, and developed a local stratigraphic column for the Grenville metasediments.

Field Assistant, Matt S. Walton, Consulting Geologist, New Haven, CT, 1956.

Mapped and analyzed faults affecting roof stability in diversion tunnels of the Oahe Dam, South Dakota.

Geologist, Carter Oil Company, Mattoon, Illinois, Summer 1956.

Interpreted geophysical well logs and constructed isopachus maps of areas in Illinois and Kentucky.

PROFESSIONAL AFFILIATIONS

Geological Society of America, Association of Engineering Geologists, American Geophysical Union, Washington (D.C.) Geological Society, and American Association of Petroleum Geologists

PROFESSIONAL REGISTRATIONS

California #3463, Delaware #249, Oregon #460, Georgia #442, Virginia #135

RICHARD H. BERRY

SELECTED REPRESENTATIVE PROJECTS

Underground Mines and Tunnels

- Design and supervision of a boring program to define the nature of a thrust fault and its effects on future operations of an underground coal mine, Buchanan County, Virginia.
- Assessment of geologic conditions and presentation of expert testimony re-regarding potential surface damage from subway tunnel construction, Montgomery County, Maryland.
- Estimation of anomolous bearing pressures anticipated from thick sandstone strata above a proposed longwall coal operation, Wise County, Virginia.
- Assessment of potential effects of faults identified from Landsat imagery and areal photographs of three existing or proposed underground coal mines in Virginia and West Virginia.
- Estimation of underground construction conditions for fifteen tunnels and six missile silo complexes in the U.S., Canada and South America. Projects typically included quantification of overbreak, support requirements and water inflow, and location of concrete aggregate sources. Prepared bid estimates for six of the tunnels.
- Underground mapping and assessment of joints and faults in the diversion tunnels of Oahe Dam, S.D., as related to a major roof collapse.
- Assessment of daily construction conditions in the 26-mile H.D. Roberts Tunnel, Colorado, and derivation of tunnelling costs and performance indices for various geologic conditions.

Foundation Conditions

- Assessment of potential surface damage from piping and other subsidence hazards associated with underground anthracite workings, Scranton, Pa.
- Investigation of landslides and slope stability for a proposed pump storage facility in Virginia.
- Design and supervision of a drilling program to assess stability of future open cuts for a phosphate mine in North Carolina.
- Investigation of geologic and construction conditions affecting overbreak in footing excavations for the New Walter Reed Hospital, Washington, D.C.
- Preparation of plans and cost estimates for geotechnical exploration of a proposed 150-mile electrical transmission line in Montana.
- Assessment of the effects of karst conditions on foundation stability for a proposed heavy construction project in western Maryland.

- Design and supervision of a boring program to assess the stability of deep rock excavations and construction conditions of several miles of pipeline for a proposed water pumping and treatment station in northern Virginia.
- Investigation of geologic conditions pertinent to remedial action required to avoid recurrence of landslide damage to a pipeline in western Pennsylvania.
- Assessment of geologic and construction conditions pertinent to reducing over-break of open cut tunnel excavations in Montgomery County, Maryland and Baltimore, Maryland.
- Geologic correlation and extrapolation of soils properties for site selection of electrical transmission lines in eastern Virginia.

#### Mineral Deposits

- Estimation of reserves for six bituminous and anthracite coal properties in West Virginia and Pennsylvania.
- Economic assessment of sand and gravel deposits in Texas, Maryland, New Hampshire and Colorado.
- Identification and economic assessment of alternative crushed stone sources for the Norfolk area, Virginia.
- Identification of volcanic ash deposits to serve as concrete pozzolan for the Yellowtail Dam, Montana.
- Estimation of the current economic potential of an abandoned gold mine, Fairfax, Virginia.
- Analysis of geologic and geophysical data for three nickel deposits in Maine, and participation in exploration planning, computerization of reserves and open pit mine designs.
- Assessment of world wide marketability of Peruvian bentonite.
- Geologic and economic appraisal of a diatomite deposit, Richmond County, Va.

#### Groundwater

- Air photo interpretation, field investigation, and design of an exploratory boring program to assess groundwater reserves associated with block faulting in the Dead Sea Rift Valley, Jordan.
- Presentation of expert testimony regarding groundwater conditions of a land-fill site in Maryland.
- Identification and assessment of a fault zone aquifer to serve the snow-making requirements of a proposed ski resort near Harpers Ferry, West Virginia.
- Investigation of swimming pool damage allegedly caused by an unusually shallow water table, Washington, D.C.
- Assessment of lightning as a cause for damage to a water well casing, Fauquier County, Virginia.



- Field investigations to identify a means of renewing geothermal waters for a health spa resort in northern Jordan.
- Design and supervision of a drilling and geophysical program to assess the anticipated underflow for a major proposed earthfill dam, Montgomery County, Maryland.
- Field investigations and assessment of groundwater information to assess the hydrologic characteristics of karst terrain proposed for underground petroleum storage, southwestern Virginia.
- Design and supervision of a drilling and monitoring program to assess groundwater conditions associated with leakage of an underground propane storage cavern, northern Virginia.

#### Structural Geology and Earthquake Assessment

- Design and supervision of comprehensive fault studies for eight nuclear power plant sites in the U.S. and abroad, including definition of age of fault offsets and earthquake potential.
- Preparation of geologic and seismologic portions of Safety Analysis Reports for five nuclear power plants in the U.S. and abroad, and senior technical review of five others.
- Design and supervision of deep seismic reflection profiling of basement faults beneath the Maryland Coastal Plain.
- Determination of the earthquake risk for several Middle East drilling platforms and a proposed liquid natural gas terminal on Cook Inlet, Alaska.
- Design and supervision of an exploratory program to define a buried sequence of emergent wave cut platforms to establish the age and earthquake potential of faulting at the site of a proposed liquid natural gas facility, Point Conception, California.

#### Waste Disposal and Environmental Assessments

- Field investigation and assessment of exploration data to define the geologic and hydrologic characteristics of four sludge disposal sites in Maryland.
- Preparation of preliminary plans and cost estimates for geologic and geophysical exploration of alternative nuclear waste disposal sites in New England.
- Design and supervision of a site selection program to define alternative land-fill sites in Montgomery County, Maryland.
- Preparation of environmental impact statements for strategic oil storage in three Gulf coast salt domes and limestone mines in Kentucky and Ohio.
- Evaluation of the relative geologic and hydrologic suitability of numerous U.S. salt mines as disposal sites for radioactive waste.

Expert Testimony

U.S. Land Commission, Baltimore, Maryland  
U.S. Military Court of Appeals, Alexandria, Virginia  
General District Court, Fairfax, Virginia  
Board of Supervisors, Montgomery County, Maryland  
Board of Supervisors, Fairfax, Virginia  
Atomic Safety Licensing Board (NRC)  
Advisory Committee on Reactor Safety (NRC)  
Virginia Corporation Commission, Richmond, Virginia  
U.S. Senate Armed Services Committee

RICHARD T. EADES

EDUCATION

West Virginia University, B.S., Geology (1982)

EXPERIENCE

Mr. Eades is a geologist with the Applied Technologies Group of SAIC. He is diversely experienced in regard to studies involving hazardous waste site investigation, characterization and remediation. He is currently involved in a confirmation/characterization study of groundwater and surface water contamination at Dover Air Force Base under a Phase II investigation of the U.S. Air Force's Installation Restoration Program. Under this program he has been responsible for development of well installation, sampling and monitoring plans, subcontracts procurement, supervision of drilling operations, assistance in soils, surface water, and ground water sampling, interpretation of geologic, hydrologic, and chemical analytical data, and report preparation. In addition, Mr. Eades recently completed another Phase II effort at McEntire ANG Base, Columbia; South Carolina, where he supervised drilling and installation of 11 groundwater monitoring wells.

Mr. Eades also assisted in the design of a parallel Phase II drilling and sampling program at Niagara Falls Air Force Reserve Facility by inputting to technical and cost proposals, scheduling, staffing and subcontractor coordination. In addition, Mr. Eades served as a team member on the Phase I investigation at Air Force Plant PJKS in Waterton, Colorado. His responsibilities included performing a site investigation to determine past and current waste handling practices, record searches and interviews to identify the environmental conditions present at the site, an evaluation of the potential for environmental contamination, recommendation for future groundwater and surface water monitoring and final report preparation.

Mr. Eades has a wide range of experience under a variety of Environmental Protection Agency studies. He has served in numerous capacities during an ongoing evaluation of the effectiveness of an asphalt cap as a remedial action at the Western Processing Company Superfund Site in Kent, Washington. Under this program Mr. Eades was responsible for assisting in the design of asphalt, soils and groundwater sampling and analysis plans, supervision of asphalt coring operations, adherence to health and safety protocol, coordination of laboratory permeability and percent air voids testing, interpretations of test results, and making recommendations on hydraulic asphalt mix and paving designs for future remedial applications. He has recently completed a separate case study on the history to date of remedial actions and their effectiveness at the dioxin contaminated Denney Farm Site in Aurora, Missouri. During this case study, Mr. Eades was solely responsible for coordination with EPA Region VII to access files and records and conduct interviews to document remedial design, execution and performance. Evaluation included determining the effectiveness of waste exhumation, site closure, on site storage and microbiological degradation.

Verified for accuracy by: Richard T. Eades

Date: 7/2/85

**SAIC**

RICHARD T. EADES

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Mr. Eades was also a key team member under an EPA program to solicit and evaluate offers to test emerging technologies to clean up hazardous waste sites and spills. This involvement included Request for Proposal development, design of evaluation criteria, proposal scoring and recommendations on various proposed technologies including sorbents, in situ vitrification, and circulating bed incineration. Under various other EPA programs, Mr. Eades has provided:

- o Confirmation of hydrogeologic data at the Vertac Site in Jacksonville, Arkansas.
- o Description of concepts and test results for permeable treatments beds and block displacement as methods to clean up or contain contaminated groundwaters.
- o And technical and cost proposals for expanding the computer data base of remedial action case histories.

Mr. Eades served under a DOE sponsored project in review and document preparation capacities for the Nuclear Waste Management Program at the Nevada Test Site. He evaluated state-of-the-art technologies and documents regarding the regulation of borehole shaft sealing of experimental wells to insure the integrity of the host medium in which hazardous waste disposal sites could be located.

Mr. Eades also has a variety of experience in the oil and gas industry in drilling, coring, completion and well testing capacities. Prior to transferring to SAIC/McLean, Mr. Eades completed a project for Gas Research Institute under which he had the responsibility of generating a geologic framework for Meigs County, Ohio, testing the relationship between gas production and photolineaments and sampling and analyzing core to determine matrix properties, fracture occurrences and offgassing data. He was responsible for providing production decline curve analyses and geologic mapping efforts, including structure contour and isopach maps incorporating data on over 300 producing wells. This work assisted in determining reservoir characteristics such as directionality of flow within a naturally fractured reservoir as well as quantifying fracture occurrences through the use of core analysis, mini-hydraulic fracturing treatments and downhole camera surveys.

Mr. Eades served as a field geologist during drilling, completion and well testing operations under the previously mentioned program and under the Department of Energy's Offset Well Test Program. He was also responsible for installing and monitoring data acquisition systems, conducting flow tests, sampling gases, placement of downhole tools (packers and pressure monitoring probes), well log interpretations and assisting in well cleanup operations.

Verified for accuracy by: Richard T. Eades

Date: 1/29/88

**SAIC**

RICHARD T. EADES

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Mr. Eades also has experience in the coal mining industry with regard to defining hydrologic impacts for existing and proposed mines. He conducted field investigations, and geotechnical evaluations of over 80 surface and underground mining operations in three Appalachian coal mining states. These evaluations involved field data acquisition, overburden sampling and analysis, water monitoring station data analysis and geologic and hydrologic interpretations regarding known or predicted environmental impacts from mining operations in West Virginia, Virginia and Kentucky. Mr. Eades was responsible for proposing groundwater and surface water monitoring stations for proposed sites and identifying shortcomings of monitoring station locations for existing sites.

#### PUBLICATIONS

Installation Restoration Program Phase I - Records Search Air Force Plant PJKS Waterton, Colorado, 1984, USAF, AFESC/DEV, Tyndall AFB, Florida and ASD/PMD, Wright-Patterson AFB, Ohio.

Multiple Well Transient Test Program in Meigs County, Ohio, Gas Research Institute 5081-213-0605.

Evaluation of the Asphalt Cover at the Western Processing, Inc., Superfund Site (Draft Final Report) EPA 68-03-3113.

Verified for accuracy by:

Richard T. Eades

Date:

7/24/85

**SAIC**

University of Pennsylvania: M.R.P., Environmental Planning (1980)  
University of Pennsylvania: Coursework toward M.S., Geology  
Franklin and Marshall College: B.A., Geology (1978)

Mr. Lapins is an environmental scientist with JRB's Waste Management Department. His project involvement has included: project and task management, coordinating and conducting field investigations at controlled and uncontrolled hazardous waste sites including, supervising the installation of groundwater monitoring wells and groundwater, soil and sediment sampling; data analysis; contaminant transport assessment; hydrogeologic and geomechanical evaluation; and alternative site remediation analysis.

Mr. Lapins is currently a Project Manager for a Department of Defense (DoD), Installation Restoration Program (IRP), Phase II hazardous materials site investigation at McEntire Air National Guard Base, S.C. The project involves investigating and determining the magnitude and extent of contaminant migration from seven disposal sites; involving the installation of twenty-three groundwater monitoring wells and the sampling of contaminated groundwater, surface water and soils. Mr. Lapins was responsible for developing all phases of this investigation from investigatory approach at each site including: monitoring network design, drilling, well specification and sampling plan preparation to costing, scheduling and staffing.

Mr. Lapins recently managed a task for EPA's Emergency Response Division which involved updating EPA's "Acceptance List" for dispersants and other chemical countermeasures for oil spills, and reformatting technical test data for each product, for inclusion in Subpart H of the National Contingency Plan as Appendix C of 40 CFR 300. The "Acceptance List" and reformatted technical product test data bulletins will serve to facilitate an expeditious selection of appropriate chemical countermeasures by On-scene Coordinators in EPA Regional offices and U.S. Coast Guard Districts in the event of a spill.

Mr. Lapins also managed a task involving the preparation of a Federal Register Notice publishing a Final Rule amending subpart H of the National Oil and Hazardous Substance Pollution Contingency Plan (NCP) (40 CFR Part 300) specifying a process in which dispersants, surface collecting agents, and biological additives may be added to EPA's NCP Product Schedule. As well as preparing the text, Mr. Lapins compiled, evaluated, and addressed public comments to the proposed regulation for inclusion in the Final Rule.

Verified for accuracy by: \_\_\_\_\_ Date: \_\_\_\_\_

**SAIC**

ANDRIS LAPINS

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Mr. Lapins has had considerable experience supervising the drilling and installation of groundwater monitoring wells, and with conducting groundwater sampling and soil/sediment sampling. Collectively, he has played a supervisory role in projects which involved the installation of more than drilling methods, and has performed groundwater sampling of more than 90 wells for county and federal clients.

For the U.S. Army, Mr. Lapins investigated and evaluated soil, sediment, and groundwater contamination resulting from munitions manufacturing activities at two Army depots in Illinois and Tennessee. His involvement in these DoD IRP projects included: developing novel sampling and health and safety procedures for sampling reactive wastes, coordinating field sampling activities with laboratory activities in accordance with the analytical requirements of samples to insure accurate analytical results, supervising the drilling and installation of groundwater monitoring wells, obtaining core and grab samples of sediments containing high concentrations of explosives, groundwater sampling, geotechnical and hydrogeologic data analysis, remedial action evaluation, and final report preparation.

Mr. Lapins also participated in an IRP Phase II hazardous materials site investigation at Hancock Field, N.Y., for the U.S. Air Force. His involvement in this project included supervising the installation of groundwater monitoring wells, evaluating analytical results for sampling activities conducted at the base, preparation of recommendations for additional site investigatory and remedial measures needed and final report preparation.

For the EPA, Mr. Lapins supervised the drilling and installation of groundwater monitoring wells at the Lipari Superfund Site in New Jersey. His responsibilities included overseeing well drilling and installation operations, enforcement of health and safety protocol (Level A Protection), collection and characterization of core samples and the maintenance of daily logs. Mr. Lapins also participated in a study of groundwater contamination from an active hazardous waste disposal site in Anne Arundel County, Maryland, where he performed groundwater sampling and data analysis. His involvement with groundwater sampling and monitor well installation has given him a good working knowledge of EPA and U.S. Army Toxic and Hazardous Materials Agency quality control/quality assurance and chain of custody procedures.

Mr. Lapins has participated in two IRP Phase I investigations at Olmsted AFB (Harrisburg International Airport) and Air Force Plant PJKS near Denver, CO for the U.S. Air Force. For these projects Mr. Lapins conducted record searches and investigated past hazardous materials management practices at each of the bases; conducted site surveys, identifying hazardous material disposal sites, rated sites using the HARM rating methodology, and prepared recommendations for future site investigatory measures.

Verified for accuracy by: \_\_\_\_\_ Date: \_\_\_\_\_

**SAIC**

ANDRIS LAPINS

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For EPA's Office of Policy Analysis (OPA), Mr. Lapins provided technical support for a national groundwater contamination modelling effort. For this project, Mr. Lapins developed a data base for examining and evaluating the risk of groundwater contamination and health effects associated with the use of road salts for highway deicing purposes. The results of his analysis will be compared with other sources of groundwater contamination for relative risk assessment to aid EPA in developing groundwater protection policy for the nation.

Mr. Lapins participated in an EPA project to evaluate the validity and accuracy of statistical test procedures specified in 40 CFR 265.93 of RCRA for monitoring groundwater quality at Interim Status facilities. His role in this project included: reviewing site information and groundwater analytical data for facilities throughout the country, providing hydrogeologic evaluations, and data coding for computer analysis.

For the EPA's Office of Solid Waste, Mr. Lapins has taken part in the development of a large computerized data base for characterizing wastes and assessing waste management practices within several segments of the Organic Chemical Manufacturing Industry. The data base which characterizes and tracks manufacturing processes, residual streams, and waste management practices will provide technical support to EPA for the development of industry specific guidelines (RCRA Phase III regulations) for hazardous waste management. Mr. Lapins' role in the project has included reviewing RCRA 3007 Questionnaires and sampling and analysis data, and coding manufacturing processes, process products, residual streams, and waste management practices for chlorinated organic, industrial organic, dye and pigment, and plastic and resin manufacturing industries. Mr. Lapins also aided in the establishment of a computerized status matrix for the EPA to track the progress of RCRA delisting petitions through regulatory review.

Prior to joining JRB, Mr. Lapins was employed as an environmental scientist by Ecolsciences, Inc., where he managed task assignments and prepared report elements for EIS's and environmental assessments specializing in the inventory, analysis, and evaluation of geologic, pedologic, and hydrologic conditions with special emphasis on groundwater impact assessments. A large segment of his responsibilities included performing siting and site suitability/feasibility analysis for municipal wastewater treatment facilities, deep well wastewater injection and land application of municipal wastewater and sludge at sites in Pennsylvania, Maryland, and Delaware. In addition, Mr. Lapins participated in the development of environmentally sensitive growth management plans for Stafford Township, Ocean County, New Jersey.

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ANDRIS LAPINS

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PUBLICATIONS

Installation Restoration Program Phase I - Records Search, Final, Air Force Plant PJKS Waterton, Colorado. U.S. Air Force AFESL/DEV, Tyndal AFB, Florida and ASD/PMD Wright-Patterson AFB, Ohio. September, 1984.

Installation Restoration Program Phase I - Records Search, Harrisburg International Airport (Formerly Olmsted Air Force Base) Middletown, Pennsylvania. U.S. Air Force AFESL/DEV, Tyndall AFB, Florida. April, 1984.

Installation Restoration Program Phase II - Confirmation/Quantification, Stage I, Final Report, for Hancock Field, New York. U.S. Air Force, OEHL, Brooks AFB, Texas. December, 1984.

Draft Environmental Impact Statement, Currituck County, North Carolina Outer Banks Access. Department of Transportation, Raleigh North Carolina. March, 1981.

Environmental Assessment of Construction Grants Projects (revisions). U.S. Environmental Protection Agency, Office of Water Program Operations, Washington, D.C. January, 1979.

Draft Environmental Impact Statement, Little Patuxent Water Quality Management Center (Savage Plant), Howard County, Maryland. U.S. Environmental Protection Agency, Philadelphia, Pennsylvania. October, 1981.

Draft Environmental Impact Statement, Leola Sewer Authority Facilities Plan, Upper Leacock Township, Pennsylvania. U.S. Environmental Protection Agency, Philadelphia, Pennsylvania. October, 1981.

Draft Environmental Impact Statement, Wastewater Management Facilities, City of Rehoboth Beach, Sussex County, Delaware. U.S. Environmental Protection Agency, Philadelphia, Pennsylvania. January, 1982.

Draft Environmental Impact Statement, Wastewater Management Facilities, City of Lewes, Sussex County, Delaware. U.S. Environmental Protection Agency, Philadelphia, Pennsylvania. October, 1981.

Verified for accuracy by: \_\_\_\_\_ Date: \_\_\_\_\_

**SAIC**

JOHN P. MEADE

### EDUCATION

Manhattan College: B.C.E., Civil Sanitary Engineering (1955)

### SUMMARY

Mr. Meade has 26 years of experience in sanitary, industrial hygiene, and bioenvironmental engineering, and is certified as an Associate Public Health Engineer in the State of New York. He is a Senior Project Manager at SAIC, working as a senior technical reviewer for a multi-task contract for remedial actions on uncontrolled hazardous waste sites. He joined SAIC as the Project Manager of a Department of Labor (DOL) contract to provide OSHA with on-site consultation services to assist small businesses in Pennsylvania.

Mr. Meade, under the terms of an EPA contract addressing the investigation of remedial actions of uncontrolled hazardous waste sites, has functioned as one of SAIC's senior technical reviewers. One of his assigned tasks is to review the majority of twenty detailed case study analyses selected from an inventory of nationwide remedial actions. The sites were selected based upon their overall priority and the remedial actions were evaluated from both their effectiveness in meeting the objectives of the site action and also from a cost standpoint. He is also the Project Officer for 6 task orders under this contract, involving various hazardous waste research & development studies.

Mr. Meade is presently supporting the Manager for the Waste Management Department and shares in the responsibility for monitoring and administering a \$4 million EPA R & D mission contract that has 29 tasks. He also manages two additional tasks that address the design and monitoring of protective covers for hazardous waste lagoons, and design of decontamination equipment and procedures for use at hazardous waste sites. Mr. Meade was the Program Manager for SAIC's Basic Ordering Agreement with Tyndall AFB to perform Phase 1, 3, and 4 Installation Restoration Program tasks at Military installations throughout the country. Mr. Meade is also the Program Manager for a large multi-task contract with the U.S. Air Force Occupational & Environmental Health Laboratory (USAFOEHL) for Phase II Installation Restoration Program confirmation studies. He is presently responsible for concurrent Phase II efforts at 6 Air Force installations. In addition, he has responsibility for performing Quality Assurance/Quality Control and functions as Senior Health and Safety Advisor at many of SAIC's field efforts, such as the #1 rated Superfund site in Glosow, New Jersey.

Prior to joining SAIC, Mr. Meade was an Air Force Colonel and Vice Commander of the USAF Occupational and Environmental Health Laboratory. He directed and monitored the daily efforts of 150 professional and support personnel, including assisting the AIHA certified laboratory to ensure compliance with applicable Federal, State, and local standards. In addition, as Chief of the Consultants

Verified for accuracy by:

*John P. Meade*

Date: 7/29/85

**SAIC**

JOHN P. MEADE

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Division, he had the responsibility for managing almost fifty environmental projects for the Air Force. This included field investigations of Air Force installations to identify potential health and environmental effects from pollutants as well as making recommendations for corrective actions.

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John P. Meade

Date: 7/29/85

**SAIC**

EDWARD W. REPA

#### EDUCATION

West Virginia University, Ph.D. Hydrology (1981)  
West Virginia University, M.S.F. Hydrology (1977)  
Baldwin-Wallace College, B.S. Biology (1975)

#### EXPERIENCE

Dr. Repa is currently a Program Manager in the Applied Technologies Division of the Waste Management Department. In this capacity, he directs the efforts of geologists, hydrologists, soil scientists and environmental scientists on projects directed at resolving hazardous waste management, technical and policy issues. Dr. Repa is currently managing approximately \$1.5 million in tasks under the Air Force's Installation Restoration Program and \$1.0 million in tasks under a task order contract with EPA's Office of Research and Development.

Dr. Repa is currently Project Manager (PM) and Principal Investigator (PI) on two Superfund research and development programs. One program is being performed at the Lipari Landfill in Pitman, NJ (Superfund Site Number 1) to assess the performance of the slurry wall and surface cap installed as the remedial action. The other program is being performed at the Western Processing Site in Kent, WA (Superfund Site Number 48) to assess the effectiveness of the asphalt surface cap in minimizing groundwater recharge.

Dr. Repa is the PM for an EPA project that is developing a manual on proven and innovative technologies for controlling the migration of hazardous waste leachate plumes. He led and developed one of the chapters of this manual entitled Groundwater Pumping. This chapter dealt with all aspects of well systems for plume control including well theory, design, installation, and costs. He is also serving as a Senior Technical Reviewer for the other chapters: Plume Dynamics, Plume Delineation, Control Technology Selection, Subsurface Drains, Impermeable Barriers, and Innovative Technologies.

Dr. Repa is also managing or has managed numerous projects under the Air Force's Installation Restoration Program (IRP). These include both Phase I-Records Search and Phase II-Confirmation/Quantification projects. IRP projects that he has participated in include: Phase I--Olmsted AFB, Harrisburg, PA; Air Force Plant PJKS, Waterton, CO; Air Force Plant 44, Tucson, AZ; and Phase II--Hancock Field, Syracuse, NY; Niagara Falls AFB, Niagara Falls, NY; Dover AFB, Dover, DE; Homestead AFB, Homestead, FL; Charleston AFB, Charleston, SC; McEntire ANG, Columbia, SC. In the role of PM/PI on these projects, Dr. Repa has developed groundwater monitoring plans, supervised the installation of monitoring wells and the collection of water quality samples, and coordinated the interpretation of hydrogeologic data.

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*Edward W. Repa*

Date: 17 JAN 85

**SAIC**

EDWARD W. REPA

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In addition to these current projects, he has also served as PM/PI on over thirty hydrogeologic impact assessments for the coal mining industry. In this role, he also supervised the installation of many monitoring wells, participated in the collection of groundwater, surface water and biotic samples, and coordinated the data interpretation and prediction of the probable hydrologic impacts from the mining operations.

Dr. Repa has also served as a Project Manager or Principal Investigator on a number of projects including:

- A theoretical evaluation of subsurface drains for use in landfills that are partially or fully located below the groundwater table.
- A review, evaluation, and critique of existing numerical and analytical groundwater models for their possible application to risk assessments associated with hazardous waste sites.
- The development of a specification manual on engineering systems that can be used to accelerate stabilization of hazardous waste piles or deposits.
- The development of groundwater monitoring plans and protocols for a Part B applicant at a hazardous waste site.

#### PUBLICATIONS

Repa, E.W. and C. Kufs. 1985. Leachate Plume Management. United States Environmental Protection Agency (in publication).

Repa, E.W., E.F. Tokarski, and R.T. Eades. 1985. Evaluation of the Asphalt Cover at the Western Processing, Inc. Superfund Site. EPA/ORD (in publication).

Kufs, C. and E. Repa. 1984. Leachate Plume Management. United States Environmental Protection Agency, MERL, Cincinnati, OH. EPA-600/9-84-007.

Repa, E., A. Wickline, N. DeSalvo and A. Lapins. 1984. Installation Restoration Program, Phase II-Confirmation/Quantification, Stage 1, Hancock Field, New York. USAF, OEHL, Brooks AFB, Texas.

Bramlett, J., E. Repa, J. Margolis, C. Furman, and S. Mahmud. 1985. Installation Restoration Program, Phase I - Records Search, Air Force Plant 44, Tucson, AZ. USAF, AFESC/DEV, Tyndall AFB, FL.

Burgher, B., E. Repa, A. Lapins, R. Eades, and J. Margolis. 1984. Installation Restoration Program Phase I-Records Search, Air Force Plant PJKS, Waterton, CO. USAF, AFESC/DEV, Tyndall AFB, FL.

Repa, E., B. Burgher, A. Lapins, C. Furman, and W. Ellis. 1984. Installation Restoration Program Phase I - Harrisburg International Airport (Formerly Olmsted Air Force Base), Middletown, PA. USAF, AFESC/DEV, Tyndall AFB, FL.

Verified for Accuracy by:

*Edward W. Repa*

Date: 17 JAN 85

**SAIC**

EDWARD W. REPA

Page 3 of 3

Kufs, C., P. Rogoshewski and E. Repa. 1982. Alternatives to Groundwater Pumping for Controlling Hazardous Waste Leachates. National Conference on Management of Uncontrolled Hazardous Waste Sites, Washington, D.C. p. 146-149.

Kufs, C., K. Wagner, P. Rogoshewski, M. Kaplan, and E. Repa. 1983. Procedures and Techniques for Controlling the Migration of Leachate Plumes. Ninth Annual Research Symposium, Land Disposal, Incineration and Treatment of Hazardous Waste. USEPA, Cincinnati, May 2-4.

Repa, E., E. Tokarski, and E. McNicolas. 1982. The Establishment of Guidelines for Modeling Groundwater Contamination from Hazardous Waste Facilities. EPA-OSW, Washington, D.C.

Repa, E., R. Fithian, H. Hefner, and J. Hoffman. 1981. Prediction of the Probable Hydrologic Consequences of Mining by the Demotto Peerless Coal Company, WV SOAP #001. Division of Reclamation, Department of Natural Resources, State of West Virginia.

Fithian, R., E. Repa, J. Meeks, and N. DeSalvo. 1981. Prediction of the Probable Hydrologic Consequences of Mining by the Winsor-Pittman Coal Company, WV SOAP 012. Division of Reclamation, Department of Natural Resources, State of West Virginia.\*

Repa, E.W. 1981. Rainfall Catch Errors Associated with Circumambient Obstructions. Dissertation, West Virginia University.

Tajachman, S.J., R. Lee, and E.W. Repa. 1978. Rainfall Additaments to Subsurface Water in a Young Pine Plantation. Water Resource Bulletin 15(2):381-6.

Lee, R., S. Tajachman, D.G. Boyer, and E.W., Repa. 1977. Normal Precipitation in West Virginia, West Virginia Agriculture and Forestry 7(2):12-8.

\*Numerous other hydrologic assessments performed; full listing available upon request.

Verified for Accuracy by:

*Edward W. Repa*

Date: *17 JAN 85*

**SAIC**

ZUBAIR A. SALEEM

#### EDUCATION

New Mexico Inst. of Mining & Tech.: Ph.D., Geoscience (Hydrology) (1969)  
Panjab University: M.Sc., Geology (Geophysics) (1961)  
Panjab University: B.Sc., Physics and Math (1959)

University of California, Los Angeles - Short Course - Systems Analysis  
of Large Scale Water-Resource Systems - 1968.

#### WORK SUMMARY

Dr. Saleem is a Senior Scientist with more than 20 years experience in quantitative geohydrologic studies including computer modeling, field studies, groundwater quality investigations and groundwater resource evaluations. His experience includes hazardous waste site investigations, contaminant transport and geohydrologic assessments.

#### PROFESSIONAL EXPERIENCE

Dr. Saleem is participating in several hazardous-waste site investigations, including the hydrogeologic investigations for in situ treatment of contaminated ground water and soils at Kelly Air Force Base, Texas, and for the Stringfellow hazardous waste site in California.

He developed the model for the Kelly Air Force Base Groundwater Bioreclamation. The model was used for the design of pumping-injection well system such that there are no adverse environmental effects on adjacent groundwaters. He also developed a sensitivity analysis model based on the EPA's proposed model for delisting hazardous waste sites.

He has also been involved with investigations of hazardous waste sites, with groundwater aspects of environmental reports and final safety analysis reports for power plants, with groundwater investigations for electric power generation facilities in North Carolina, Washington, Florida and the Phillippines. He has been working on modeling of contaminant transport and dispersion in aquifers, and with groundwater investigations for a coal gasification plant in Kentucky, for power plant siting and seepage studies. Examples of specific projects are:

Dr. Saleem was the lead on the geologic, hydrologic and geophysical investigations for site characterization for two hazardous waste sites. The site characterization plans were approved by the regulatory agencies for a hazardous waste site for a confidential client in Fulton County, New York, and for a confidential client in Monmouth County, New Jersey. He was responsible for the supervision of Phase I field investigations and for the design of Phase II field activities at the two sites.

Verified for accuracy by:

Zubair A Saleem

Date:

3/12/85

ZUBAIR A. SALEEM

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He developed ground-water simulation models for the two well fields, National Power Corporation of Philippines for the evaluation of long-term yield of aquifers to supply ground water to the power plant. He also determined the hydrologic budgets for the two areas.

U.S. Department of Energy's Licensing Project Manager (LPM) Project for the Isolation of High Level Radioactive Waste (\$19 million). As leader of the geosciences-geotechnical staff on the LPM Project, he directed the activities of the staff, coordinating all geotechnical inputs to the Project Tasks, and advising the Project Manager on geotechnical and budgetary matters.

He performed site specific and regional ground water analyses for ground water supply and for transports of contaminants for accident analysis scenario. Shearson Harris Nuclear Power Plant, North Carolina. Developed the ground water monitoring program for the plant site and responded to questions and provided input to the Nuclear Regulatory Commission hearings.

He has evaluated ground-water related inputs to the licensing documents Safety Analysis Reports for several nuclear power plants located in different hydrogeologic settings, including: St. Lucie Nuclear Power Plant, Florida Power Light Co.; Waterford Unit 3, Louisiana Power Light Co.; WPPSS Units 3 and 5, Washington Public Power Supply System; Philippines Nuclear Power Plant Unit 1, National Power Corporation; and Shearson Harris Nuclear Power Plant, Carolina Power Light Co.

Dr. Saleem was Project Coordinator and lead for all investigations for the Eastern Geothermal Drilling Project, Lewes, Delaware, U.S. Department of Energy. He developed the Project Management Plan and the Well Plan for the 9,000 feet deep geothermal well on the East Coast in Delaware.

He performed analyses for determining the feasibility of developing and exploiting the geothermal resources in the area of Berlin, Maryland for the district heating-cooling Project. U.S. Department of Housing and Urban Development.

For the St. Johns River Power Park (coal-fired power generation units), Florida Power Light Co., and Jacksonville Electric Authority, he evaluated the geohydrology, including the performance and analysis of pump tests, construction dewatering plans, and performance of slurry wall and grout curtains.

Dr. Saleem was also Associated Professor in charge of Hydrology Program at the University of Illinois, Chicago, responsible for teaching and research in groundwater hydrology. He taught undergraduate and graduate courses including advanced groundwater hydrology, groundwater management, engineering geology, computer applications in geology, hydrology, hydrogeochemistry, environmental geology, and introductory geology. He was responsible for the development of the water quality laboratory.

Verified for accuracy by: Zubair A. Saleem Date: 3/12/85



ZUBAIR A. SALEEM

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Developed computer models for the simulation of transport of contaminants in aquifer systems; models for the drawdown distribution due to well fields in coupled leaky aquifers; a study for the optimal utilization of water resources of Northeastern Illinois; analysis of aquifer characteristics of Long Island for the Suffolk County, New York; investigation of the clogging and contamination of aquifers due to artificial recharge; investigation of effects of road salts on quality of waters of an urban basin; study of the hydro-geochemistry of ground waters of the Chicago Metropolitan area; evaluation of underground compressed air energy storage-underground pumped hydro storage development cost and potential; heat pump centered integrated community energy systems using aquifers; and review of mathematical, experimental, and computer models for the simulation of seepage from uranium tailings for the U.S. Department of Energy through ANL.

Responsible for the supervision of groundwater hydrology aspects of projects for Harza Eng. Company for one year while on leave from the university. Projects included the evaluation of the groundwater contamination potential from a disposal pond site; evaluation and control of seepage from a large dam on a hydro-electric project; potential of artificial recharge of ground water in the Great Salt Lake basin; Urban Storm Water Quality Model.

Dr. Saleem was the co-principal investigator of the Pecos River Basin Inter-disciplinary Project involving quantitative analysis of a complex over-drawn irrigated basin in a semiarid climate. Supervised assistants and taught the course on "Theory of Groundwater Motion." Principal Investigator, "simulation of coupled leaky aquifer systems," funded by OWRR. Developed a stochastic dynamic programming model; a method for the simulation of flow in multi-aquifer systems; computer method for the piping test analysis; salt-water encroachment in leaky aquifers and times of travel for an impulse in multi-aquifer systems. He has also conducted gravity and magnetic surveys of over 1000 square miles: (1) Potwar Basin for the identification structural traps for oil exploration; and (2) Swat State area for defining the origin of granitic masses. Seismic refraction survey for the Tarbela dam site. Performed electrical resistivity surveys of Babar Kachh dam sites and of Quetta Valley in Baluchistan for the location of water-bearing gravel lenses.

#### ARTICLES, PRESENTATIONS, PUBLICATIONS, AND REPORTS

(Selected from a List of More Than 65)

Electrical resistivity investigations of the Baber Kachh dam sites, Sibi District, Pakistan: Geol. Bull. Pan. Univ., no. 4, 17-22, Dec., 1964.

A computer method for pumping-test analysis: Journal of Ground Water, v. 8, no. 5, 21-24, 1970.

Dynamic Programming Model and Quantitative Analysis, Roswell Basin, New Mex: N.M. Water Resources Research Institute Report No. 10, pp. 180, (with C.E. Jacob), January, 1971.

Verified for accuracy by:

*Zubair Saleem*

Date:

*3/12/85*

ZUBAIR A. SALEEM

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Optimal use of coupled leaky aquifers, Water Resources Research, vol. 7, no. 2, p. 382-393, (with C.E. Jacob), April, 1971.

Lead content of soils along Chicago's Eisenhower and Loop-Terminal Expressways, Arc. of Environmental Contamination and Toxicology, v. 1, no. 3, 209-233, (with W.C. Coello and M.A.Q. Khan), 1973.

Clogging in simulated glacial aquifers due to artificial recharge: Water Resources Research, v. 9, no. 4, 1047-57, (with David P. Ripley), 1973.

Method for numerical simulation of flow in multiaquifer systems: Water Resources Research, v. 9, no. 5, October, 1973.

Drawdown distribution due to well fields in coupled leaky aquifers: 2. Finite aquifer system: Water Resources Research, v. 10, no. 2, April, 1974.

Chloride balance of an urban basin in the Chicago area, Water Resources Research, v. 10, no. 5, (with Gerald M. Wulkowicz), October, 1974.

Hydrogeochemistry of carbonate groundwaters of an urban area: Water Resources Research, v. 10, no. 6, December, 1974 (with David T. Long).

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Determination of long-term yield of well fields through computer simulation, Ann. Meeting of Assoc. of Engineering Geologists, Dallas, Texas, 1980.

Geohydrologic aspects of high-level radioactive waste repository licensing, annual meeting of The Geological Society of America, SC Section, 1983.

Geologic and hydrological aspects of low-level radioactive waste disposal facility siting and licensing, Annual Meeting of the Geological Society of America, South-Central Section, 1983.

Tectonic stability aspects of high-level radioactive waste repository siting and licensing, with N.R. Tilford and R.P. Cannon, Proceedings of the waste Management Symposium, 1983.

Geohydrologic characterization of former coal gasification plant sites, with J. Palmer, W. Scarlett, and Fredric Snider, Second Conference on Municipal, Hazardous, and Coal Wastes Management, Miami, December, 1983.

Management of hazardous chemical waste sites, with N.R. Tilford, 27th Annual Meeting of Association of Engineering Geologists, Boston, MA. 1984.

Verified for accuracy by: Zubair A. Saleem Date: 3/12/85

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BOOKS EDITED

Advances in Groundwater Hydrology, American Water Resources Assoc. Washington, D.C., p. 333, 1977.

A Decade of Progress in Water Resources, American Water Resources Assoc. Washington, D.C., with S.C. Csallany and W.J. Roberts, 1975.

Geological Disposal of High-Level Radioactive Wastes, Assoc. of Engineering Geologists, with N.R. Tilford, 1981.

PROFESSIONAL ACTIVITIES

Chairman, Technical Program Committee, International Association of Engineering Geology (IAEG) Symposium on Management of Hazardous Chemical Waste Sites, cosponsored by the Amer. Society of Civil Engineers, Amer. Geophysical Union, and U.S. Environmental Protection Agency, October 9-10, 1985.

Co-chairman, Symposium on "Geological Licensing Topics in High and Low-Level Radioactive Waste Management," sponsored by the Geological Society of Amer. 1983.

General Chairman, 12th Annual American Water Resources Conference, Chicago, Illinois, 1976.

Chairman, Symposium on "Advances in groundwater Hydrology," sponsored by American Water Resources Association, in cooperation with the American Society of Civil Engineers, International Water Resources Association (IWRA) and U.S. Geological Survey, held in Chicago, Illinois, 1976.

Editorial Board, Water Resources Bulletin, 1978-1981.

AWARDS, HONORS, PROFESSIONAL AFFILIATIONS, AND CERTIFICATIONS

Fulbright Fellowship; Distinguished Service Award, American Water Resources Association; Service Award, Association of Engineering Geologists; and the University of Illinois Fellowship.

American Geophysical Union; American Institute of Hydrology; American Society of Civil Engineers; American Water Resources Association; Association of Engineering Geologists; International Water Resources Association; National Water Well Association; International Association of Engineering Geology.

Registered Professional Hydrogeologist (AIH).

Registered Professional Geologist in states of Delaware and Indiana.

Professional Listings - American Men and Women of Science  
Leaders in American Science.

Verified for accuracy by:

Zubair A. Saleem

Date:

3/12/85

EDWARD F. TOKARSKI

EDUCATION

University of Pennsylvania: B.A., Environmental Science and Biology (1979)  
George Washington University: Graduate Level Courses towards M.A., Geology.

EXPERIENCE

Edward F. Tokarski is a Project Environmental Scientist with over six years experience conducting a wide variety of hazardous waste management projects. His experience ranges from conducting and managing complex, multi-media field investigations to providing technical support during implementation of regulatory programs. He has a thorough understanding of site investigation procedures, having participated in RI/FS studies under EPA's Superfund programs, and having conducted and managed site investigations under the Department of Defense's Installation Restoration Program for the U.S. Air Force, Army, and Navy. He presently is managing a \$350,000 IRP Phase II study of ten waste sites located on an Air Force base. He has developed site cleanup plans and has participated in research and development studies of waste site remediation technologies, and so is, therefore, familiar with applying data and developing remedial actions. He also is familiar with the RCRA regulations governing hazardous waste management and currently is reviewing RCRA Part B Permit Applications for completeness and technical accuracy. He used knowledge gained conducting "hands-on" studies when he wrote sections of EPA Technical Guidance Manuals on slurry wall construction and leachate plume management. Mr. Tokarski has demonstrated his abilities by successfully completing the highly complex technical activities associated with hazardous waste site investigations and feasibility studies.

Mr. Tokarski has conducted IRP projects for the Air Force, Army and Navy. He is managing a \$350,000 study at a U.S. Air Force base to confirm and characterize environmental contamination at ten waste sites. In addition to overall project management, he is responsible for technical aspects of the investigations and has evaluated background data, developed investigation approaches, led field teams during monitoring well drilling and sampling, evaluated data, and developed plans and schedules for additional activities. During a Phase 2-Systems Development Study for the U.S. Army, he was Team Leader and was responsible for scoping, planning, and carrying out the sampling of sediments contaminated with TNT and RDX. He also participated in Phase I Initial Assessment and Phase II Confirmation Studies at a Naval installation, during which he supervised the installation of 24 monitoring wells, collected surface and groundwater samples, assisted in the excavation of a suspected waste pile, evaluated collected data, and helped prepare the report concerning site hydrogeology and groundwater quality. This experience has given Mr. Tokarski a working knowledge of the IRP programs for all three services (the Navy has responsibility for USMC projects).

Mr. Tokarski has experience with RI/FS studies carried out under EPA Superfund and similar programs. He served as a field supervisor during the installation of groundwater monitoring wells surrounding Love Canal and was responsible for proper well installation, soil/rock sample collection,

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preliminary groundwater quality monitoring, and on-site health and safety. Mr. Tokarski assessed the hazard posed by the effects of acidic water on clay soils at a Superfund site, developed preliminary remedial alternatives and costs, and wrote sections of the final report. He assisted a county government by evaluating data and developing a monitoring plan for a hazardous materials landfill that was the subject of intense public opposition, and by presenting findings at public meetings and developing recommendations. He managed a project to assess 23 waste sites to establish priorities for additional remedial work, during which assessment reports were developed for each site and selected sites were evaluated using the CERCLA Hazard Ranking System. He was a member of an SAIC team that took core samples through an asphalt cap at an NPL site and subsequently evaluated cap effectiveness. He currently is a Task Manager for a large RI/FS being conducted at a privately-owned landfill. The project is being performed under a consent order issued by a state environmental protection department. Mr. Tokarski's Superfund related experience shows that he is able to successfully complete RI/FS projects for EPA, state, and private clients.

Mr. Tokarski has participated in many projects for EPA's Office of Research and Development during which he applied his site investigation and remediation experience. He prepared chapters on contaminant movement in groundwater and plume detection and delineation as part of a comprehensive document on the management of leachate plumes. He developed sections concerning costing and associated remedial measures for a technical handbook concerning slurry cutoff wall use at waste sites (EPA-540/2-84-001). He prepared a short feasibility paper on the technical, legal, and political issues associated with transport and ocean dumping of large quantities of soil contaminated with low levels of dioxins and PCBs. Mr. Tokarski led field teams collecting samples from leachate collection systems at state-of-the-art landfills in order to identify waste-leachate production characteristics. Recently, he reviewed and evaluated data and wrote sections of the technical report discussing SAIC's post-implementation monitoring of remedial actions at the Lipari landfill. These and other R&D tasks completed by Mr. Tokarski have provided him with an understanding of state-of-the-art techniques for investigating and cleaning-up hazardous waste sites.

In addition to his site investigation and remedial action activities, Mr. Tokarski has substantial experience in working with the RCRA Subtitle C regulations concerning hazardous waste management. He analyzed regulations and supporting background information prior to industry comment. Mr. Tokarski has helped brief SAIC staff on the RCRA requirements prior to inspections, and has modified existing site inspection checklists to make them more useful to field personnel. He also has evaluated the regulatory requirements and implications associated with site investigation activities. Mr. Tokarski is currently assisting EPA's regulatory efforts by conducting completeness and accuracy checks on RCRA Part B Permit Applications. He has evaluated applications for incinerators, land treatment sites, surface impoundments, landfills, and storage areas, and is familiar with the RCRA regulatory requirements and the permitting process.

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*Edward P. Tokarski*

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In successfully completing these and other tasks, Mr. Tokarski has demonstrated his technical knowledge of site investigation procedures including: site identification, sampling and analysis, well installation, documentation and chain-of-custody, health and safety, contaminant transport, and hydrogeologic assessment. This experience also proves his ability to develop remedial alternatives, conduct regulatory analysis, apply technical expertise in developing guidance manuals, and work on politically sensitive projects. The success of the projects Mr. Tokarski has managed demonstrates his ability to realistically scope out a project and appropriately manage technical staff.

Verified for accuracy by:

*Edward L. Tokarski*

Date: 10/18/85

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1. Repa, E., McNicholas, E., Tokarski, E., and Harris, J. The Establishment of Guidelines for Modeling Groundwater Contamination from Hazardous Waste Facilities - Groundwater Models Profile. Prepared for USEPA Office of Solid Waste. July 1982.
2. Tokarski, E., Spooner, P., and Farmer, G.T. Hydrogeologic Investigation of the Naval Air Development Center Waste Disposal Sites, Warminster, PA. Prepared for the Naval Air Development Center, Warminster, PA 18974. March 1983.
3. Wagner, K., and Tokarski, E., Feasibility of Barge Transport and Ocean Disposal of Dioxin Contaminated Soils. Prepared for USEPA Municipal Environmental Research Laboratory. Cincinnati, Ohio, November, 1983.
4. Spooner, P., Wetzel, R., Spooner, C., Furman, C., Tokarski, E. and Hunt, G., Slurry Trench Construction for Pollution Migration Control. EPA-540/2-84-001, USEPA - Municipal Environmental Research Laboratory. Cincinnati, OH. February 1984.
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APPENDIX M: References



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